Four-Forest Restoration Initiative DEIS Individual Response to Comments

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authors	comment Text	response Text
Alfonso, Leonardo	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must	(136-1) Thank you for your comments. Please see our responses to letter 19.

Artley, Dick	include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. I have reviewed the DEIS for the Four Forest Restoration Initiative Project. Before I begin my comments I ask you to please consider them in the context of what these wise and caring people have to say. Also remember that the public pays you to protect and conserve their national forests. Indeed, you have 314 million supervisors. Below are 3 quotes from a man who nearly became the 1st USFS Chief. Sadly, he was overlooked in favor of a man who learned industrial forestry in Europe. "God has cared for these trees, saved them from drought, disease, avalanches, and a thousand tempests and floods. But he cannot save them from fools." "The wrongs done to trees, wrongs of every sort, are done in the darkness of ignorance and unbelief, for when the light comes, the heart of the people is always right." "Our government is like a rich and foolish spendthrift who has inherited a magnificent estate in perfect order, and then has left his fields and meadows, forests and parks, to be sold and plundered and wasted." John Muir, August 1897	(8-1) This comment includes general statements. No response is required.
Artley, Dick	The DEIS is Programmatic and not Site Specific as NEPA Requires. Mr. Provencio, Mr. Dechter, and Ms. Coté how is a person to determine if their favorite camping site of fishing location will be affected by logging on a 1" = 10 mile scale map? Indeed, it's impossible to even find their favorite camping site of fishing location on the laughable maps. Have you lost your minds? What will you tell a judge when he/she asks you why the final EIS reeks with NEPA violations and hides information from the public given the fact that 2 NEPA "experts" were on the IDT?	(8-2) Thank you for your comment. In addition to the 8.5 x 11 maps in the DEIS, a packet of poster-sized maps (of each alternative and the past, present and reasonably foreseeable actions associated with cumulative effects) was made available in both hard copy and DVD format. These maps were available electronically on the project's website at http://www.fs.usda/gov/main/ 4fri/planning. An interactive map, accessed electronically from the project's website was made available. The interactive map allowed users to scroll over each and any feature within the project area to review all proposed treatments (by alternative). This feature also allowed the user to see where treatments are proposed in relation to wildlife habitat (specifically Mexican spotted owl and northern goshawk). The project's website states, "An interactive map of the proposed activities by alternative is available at http://my.usgs.gov/ppgis/studio/launch/5019. The intent of this map is to provide additional detail not available on printed maps, a simple way to compare alternatives, and the ability to supply a spatial component

that you can use during the formal comment period. Map packets that provide treatment details by alternative are available upon request". No information was provided regarding the site-specific nature of the DEIS was provided. However, we would like to respond to the concern. The DEIS displays at least 20 specific silvicultural and prescribed fire treatments for each alternative (web-based DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (web-based DEIS, page 74) displays road activities by restoration unit and table 19 (web-based DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatmentsby restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (web-based DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (web-based DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements.

Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions (web-based DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (web-based DEIS, page 601). The site-specificity of the analysis was tested by the 4FRI stakeholder group on May 12, 2013. In response to comments on the DEIS, the stakeholders wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue" (4FRI Stakeholder, 2013 Cara Letter 155). Most examples of using site-specific data to inform the environmental consequences in the DEIS can be

		found in the each resource report in the methodology sections. Examples in the DEIS include fire which discloses fire behavior at specific locations of concern, at the subunits, the restoration unit, landscape scales and specific locations (such as Pulliam Airport, Kachina Village, Perkins Telescope, etc. (web-based DEIS, p. 150). How individual MSO PAC treatments were identified for treatment in appendix B pp. 443-444 of the DEIS.
Artley, Dick	Supervisors Stewart and Williams, you have Chosen to Deceive the Public with Euphemisms and Untruths in an Attempt to Portray Commercial Logging as an Ecosystem-Friendly Activity You both obey your corporate masters by naming this a “restoration” project.	(8-3) Thank you for your opinion.
Artley, Dick	Comment: Supervisors Stewart and Williams, this DEIS does not address how the proposed timber sale will damage the countless non-vegetative natural resources in the sales area. You are well aware that most available scientific literature authored by respected scientists explains how logging and road construction will considerably harm these important resources. True to form Supervisors Stewart and Williams, you conveniently withhold this important information from the public by assuring there is no literature in the References sections that describes the truth … logging and roading destroys the proper functioning of many important natural resources.	(8-4) Thank you for your comment. A summary of environmental consequences can be found in the DEIS, Chapter 2, Table 31. The environmental consequences are disclosed in the (web-based) DEIS from page 105 to page 331. DEIS environmental consequences are disclosed in resource reports as follows: Fisheries, page 59 to page 107, Botany, page 22 to page 136, Fire Ecology, page 93 to page 250, Silviculture, page 61 to page 151, Wildlife, pages 173 to 461, 632 to 645, 655 to 676, Heritage, page 9 to 13, and Tribal Relations, page 13 to page 22, Recreation, page 42 to page 89, Scenery, page 53 to page 80, Lands and Special Uses, page 9 to page 13, Socioeconomics, page 20 to page 33, Range, page 26 to page 40, Soils, page 60 to page 121, Water Quality and Riparian, page 51 to page 91, Transportation, page 13 to page 21. Climate change is summarized in the (web-based) DEIS on pages 321 to 330. Regarding impacts to resources from roads, please see our responses to attachment 4 which was submitted. We provided specific responses since this attachment provided more details on the concern.
Artley, Dick	Comment: Supervisors Stewart and Williams, none of the scientific documents listed in the attachments to these comments are listed or cited in the References section of this DEIS. Please assure that 1) the natural resource damage caused by this timber sale is described in detail in Chapter 3 of the final NEPA document, and 2) some of the documents contained in the attachments to these comments are included in the Reference section and cited in the body of the final EIS.	(8-5) Thank you for your comment. Each attachment was reviewed and a determination was made on whether the information was within the scope of this analysis and whether the information provided should be included in the analysis and FEIS. Each reference was categorized as primary science, grey literature or popular press. Please refer to the individual responses provided on each attachment.
Artley, Dick	Comment: The vast majority of the American public believes	(8-6) Thank you for your opinion/position statement.

Artley, Dick	damaging natural resources in order to provide volume and profit to resource extraction corporations will destroy the natural gifts to be inherited by future generations of Americans. Designating this commercial timber sale as a “restoration” project is criminal. The only thing this timber sale restores are the bank accounts of the corporations that will do the logging.	(8-7) Thank you for your opinion/position statement.
Artley, Dick	Noble, Thompson, Keckler, Fletcher and Russell, you should all be Ashamed to Allow your Name to be Connected with a Project that will Drive Two Species Closer to Extinction Competent wildlife biologists would never stand by and allow anyone to consciously cause harm to rare species for any reason. Are you proud to be “yes” people? The public pays your salary. They expect you to do your job in an ethical manner. They would have expected you to express outrage when you became aware of the forest plan amendments to allow more logging to occur than the forest plan allowed.. I have news for you. You cannot change the forest plan to allow ESA violations with impunity. · Why would any of you look the other way when Stewart & Williams propose forest plan amendments to allow logging to damage the habitat of the goshawk and Mexican Spotted Owl? · Why would any of you look the other way when Stewart & Williams lie to the public by stating logging will improve MSO nesting and roosting habitat? · Why would any of you look the other way when Stewart & Williams propose forest plan amendments to remove language that references the requirement for USFS monitoring of pre- and post-treatment, MSO population and habitat? · Why would any of you look the other way when Stewart & Williams propose forest plan amendments to remove language that limits PAC treatments in the recovery unit to 10 percent increments and requires the selection of an equal number of untreated PACs as controls. The bottom of page 17 states: “Forest health is defined by the vigor and condition of the forest stands (see previous discussion on stand density) and the presence of insects and disease that affect the sustainability of the forest.” Now I’m certain every wildlife biologist on the 4 forests genuflects repeatedly to timber industry employees whenever they are encountered. The DEIS at page 17 defines forest health by the “vigor and condition of the forest stands and the presence of insects and disease that affect	(8-8) Thank you for your opinion/position statement.

	the sustainability of the forest." This is a "timber beast" definition of forest health.	
Artley, Dick	Comment: A forest is infinitely more than trees. Any wildlife biologist who ignores the health of the countless other natural resources in the forest when defining forest health has no business calling themselves wildlife biologists.	(8-9) Thank you for your opinion/position statement.
Artley, Dick	Comment: If the trees in a forest were all vigorous and without insects & disease there would be no biodiversity and no natural disturbance events that benefit the countless other resources in the forest. Any wildlife biologist who ignores the health of the countless other natural resources in the forest when defining forest health has no business calling themselves wildlife biologists.	(8-10) Thank you for your opinion/position statement.
Artley, Dick	Comment: Competent wildlife biologists would not stand by quietly as Stewart and Williams equate the goals of a private industrial tree farms with the definition of forest health on public land. ---------- ----------	(8-11) Thank you for your opinion/position statement.
Artley, Dick	The Documents that Appear in the References Section of the DEIS have been Carefully Selected to Omit Literature Describing Logging-Caused Resource Degradation. Please Read the Opposing Views Attached to these Comments to Refresh your Memory about what you are about to Inflict to the Forest Ecosystem you are Sworn to Protect. The attachments to these comments present the "responsible" opposing views of hundreds of independent, unbiased Ph.D. biological scientists who describe the resource damage caused by the majority of commercial timber and road construction sale activities taken at any location, on any topography, at any elevation, at any time. Supervisors Stewart and Williams, your response to each of these opposing views is governed by 40 C.F.R. § 1502.9(a). Please remember, by definition, a viewpoint is a personal opinion. This member of the public has provided the electronic links to the source documents for each opposing view for you to verify that a Ph.D. biological scientist authored the opposing view.	(8-12) Please see our response to comment 8-5.
Artley, Dick	Comment: Please include (and cite) some of the source documents for the opposing views contained in the attachments to these comments in the References section of the final EIS. When describing the environmental effects of the timber sale activities to the countless natural resources in the project area please cite the	(8-13) Please see our response to comment 8-5.

	resource damage described in the source documents contained in the attachments.	
Artley, Dick	The law does not allow the Responsible Official to 1) respond in general to all opposing views in a few paragraphs, nor does the law allow the Responsible Official to respond with general statements that the adverse effects described by the scientists who had the opposing view are analyzed and described in Chapter 3. If the Responsible Official chooses not to respond to each responsible opposing view or opinion please tell the public why in the final NEPA document.	(8-14) Please see our response to comment 8-5. In response to comments on the DEIS, each resource specialist addressed opposing views if relevant. Per 40 CFR 1503.4, summarized responses to comments received on the draft EIS were included in the FEIS. All comments received were reviewed and responded to individually. The complete comment analysis and response document is located in the project record and is available on the project's website at: http://www.fs.usda.gov/main/4fri/planning.
Artley, Dick	Comment: Please comply with 40 C.F.R. § 1502.9(a) by responding to each opposing view in Attachments #1 and #4.	(8-15) Please see our response to comment 8-14 and 8-5.
Artley, Dick	Much of the Literature Identified in the References Section of the 4FRI DEIS has not been Peer Reviewed Comment: The References section of this DEIS identifies (and cites) many documents that have not been peer reviewed. The peer review process assures that projects are based on information that is: · accurate, · not opinionated, · authored by someone who knows the issues, and · not biased towards project implementation. Keep in mind the agency is required by law to assure that the information is "high quality" and "accurate." [1500.1(b)] In the References section of the final revised EIS please list only documents that have been peer-reviewed.	(8-16) No specific information was provided which would identify specific disagreements with the best available information used to inform the DEIS.
Artley, Dick	Comment: There is a standard literary standard to inform the public that documents have been peer reviewed. Government documents have peer-review requirements issues by the White House Office of Management and Budget (OMB). The link to these requirements is: http://en.wikipedia.org/wiki/U.S._Government_peer_review_policies This member of the public has checked the documents cited in the References section and more than a few do not meet these requirements	(8-17) Please see our response to comment 8-16.
Artley, Dick	Comment: Supervisors Stewart and Williams, why has it never occurred to you that the fix is in? Most documents cited in your References section are authored by USDA employees, in spite of the fact that the vast majority of scientific literature describing the ecological effects of logging were written by independent scientists unaffiliated with the USFS.	(8-18) Please see our response to comment 8-14.

Artley, Dick	If the Responsible Official is Really Concerned about Aquatic Species' Health the Final EIS Must Indicate that All Temporary Roads will be Obliterated after Use The DEIS indicates temporary road construction is a connected action to this timber sale. The DEIS at page 40 indicates that temporary roads will be "decommissioned" after use. If the Responsible Officials really wants to eliminate the sediment originating from temporary roads they will obliterate all temporary roads after use and say this will be done in the final EIS and ROD. Comment: An obliterated road contains no running surface, because the natural sideslope that existed before the road was constructed is reestablished. Not obliterating a road because the line-officer will use it again to haul logs from the area means the road is not temporary. Therefore the road should be constructed to system road standards or not at all. Comment: Decommissioning these temporary roads will not remove the running surface. Therefore, since temporary roads are outsloped with no ditch, sediment will be generated during precipitation events, find its way to streams and harm the aquatic resources … for decades until the next timber sale. No amount of brush or grass placed on an outsloped running surface will stop sediment from being generated and deposited in streams.	(8-19) Page 350 of the DEIS provides a definition of road decommissioning. These include: activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1, FSM 7705—Transportation System, USDA 2003). FSM 7712.11- Exhibit 01 identifies five levels of treatments for road decommissioning which can achieve the intent of the definition. These include blocking the entrance, revegetation, waterbarring, removing fills and culverts, establishing drainageways and removing unstable road shoulders, and full obliteration, recontouring, and restoring natural slopes. In response to comments on the DEIS, an additional design feature (T9) has been developed in appendix C which states, "As a condition of approval for use of a temporary road within a Timber Sale Contract or Stewardship Contract, temporary roads will be decommissioned by the purchaser/contractor when mechanical treatments are finished using the adaptive management actions listed in Appendix A of the Transportation Specialist Report". The DEIS disclosed the effects of temporary roads on pages 181,185-86,201-02,205-207, 219-20, 223, 258, 260-61, 264, 269, 271, 284, 288, 299, 307, 313, 318,-20, and 330-31 and lists design features/mitigations within the DEIS on pages 566, 575-77.
Artley, Dick	The Predicted Environmental Consequences Described in Chapter 3 of the DEIS are Untrue and Deceptive	(8-20) Thank you for your position/opinion statement. The DEIS disclosed the effects of the proposed actions in Chapter 3 of the DEIS.
Artley, Dick	Congress promulgated laws mandating Responsible Officials to accurately describe and disclose the predicted environmental effects (positive & adverse) of implementing the Proposed Action.	(8-21) The predicted direct and indirect environmental effects for each alternative can be found in the DEIS Chapter 3, pages 105-332.
Artley, Dick	Comment: This member of the public does not understand why the predicted resource damage resulting from this timber sale is consciously minimized, lessened and played-down in Chapter 3 using the words: "short-term," "temporary," minor," and/or "unmeasureable" repeatedly without explanation. Comment: If the Responsible Officials choose to use the terms short-term," "temporary," minor," "negligible" and/or "unmeasureable" anywhere in Chapter 3 of the final EA there must scientific data, empirical evidence and/or references to monitoring reports that support the claims. Unsubstantiated statements written by unknown authors whose employment depends on selling timber sales would	(8-22) Thank you for your opinion. The best available science was used by each specialist in formulating/analyzing the alternatives and the direct, indirect, and cumulative effects relative to each alternative. Terms such as short-term, long term, minimal and not measurable are used because we are required to consider magnitude, duration and the significance of changes when evaluating environmental consequences. We are required to adequately address context (significance of an action in terms of society as a whole, an affected region, affected interests and locality) and intensity (severity of the impact). See 40 CFR 1508.27. There are no unnamed or unknown authors as every specialist who has worked on the DEIS/FEIS has their name associated to their

	be ruled inadmissible by any judge in a court of law.	respective specialists' reports.
Artley, Dick	Once again this is an instance where the other resource specialists on the IDT drop the ball to please the corporations.	(8-23) Thank you for your opinion.
Artley, Dick	Supervisors Williams & Stewart it Appears that Volume Accumulation is more Important to you than Assuring Public Safety should a Wildfire Occur? The DEIS at page 21 states: "Wildland-urban interface (WUI) areas are spread across the project area and are located within or adjacent to the communities of Flagstaff (RU 1, 3, 4, 5), Williams (RU 3, 4), Tusayan (RU 6), Parks (RU 3, 4), Belmont (RU 3, 4), and scattered developments such as Doney Park (RU 5), Munds Park (RU 1), and Kachina Village (RU 3). Although past fuel treatments have been implemented in the WUI closest to the major population centers, much of the landscape is still vulnerable to fire or to second order fire effects such as flooding, erosion, weed infestations, and damaged infrastructure." Clearly THE most important responsibility of a public land manager is to protect the safety of the public living near national forest land should a wildfire occur.	(8-24) The purpose and need for this project is restoration and was not confined to a fuels treatment, see the background and purpose and need sections in Chapter 1 of the DEIS. There are about 535 acres of proposed WUI (fuels) treatments, all in RU6. See the DEIS, chapter 2, alternatives section.
Artley, Dick	Dr. Jack Cohen is a USFS fire physicist working in Missoula, Montana. He has devoted his entire working career researching methods to reduce the risk of fire damage to homes located in the WUI.	(8-25) Thank you for this information. Please see our response to attachment #11 in comment letter 221.
Artley, Dick	Comment: Please comply with 40 C.F.R. § 1502.9(a) by responding to each opposing view in Attachments #3 and #11.	(8-26) See response 8-14. All attachments were reviewed and categorized. All attachments were assigned a specific letter number for easier tracking. See comment letters 216 to 224.
Artley, Dick	Dr. Cohen recommends removing fine flash fuels within a few hundred feet of a home at risk. That's why kindling is used to start a fire in the fireplace, Supervisors Stewart and Williams, you have not chosen to analyze a Dr. Cohen alternative in detail. A Cohen alternative would propose to spend earmarked fire funding to: · educate the public with by providing each homeowner in the WUI written material that summarizes Dr. Cohen's findings. · educate the public using USFS organized public meetings to answer questions about the types of fine fuels that Dr. Cohen recommends should be removed. · and most importantly offer USFS labor to help elderly and disabled people living in the WUI (with their written permission) to remove the fine fuels near their home as Dr. Cohen suggests. Dr. Cohen's fire damage risk reduction methods are the most effective	(8-27) Please refer to comment letter 221 for our complete response. This response addresses attachment #11 in it's' entirety. The purpose and need of the 4FRI DEIS is disclosed on pages 8-29. This is a landscape restoration project and not a fuels reduction project in the Wildland Urban Interface, nor is it a timber sale as the author claims. The Forest Service agrees as Dir. Cohen states in Mr. Artley's response, that ecosystem restoration treatment and fuel treatment are not synonymous. The 4FRI DEIS clearly states this is a landscape scale ecosystem restoration project in the project purpose and need (DEIS Chapter 1, p 8-29). It is not a fuels reduction project, it is not a timber sale project, it is restoration.

that exist. He does not recommend logging merchantable trees near the WUI as is being proposed with this commercial timber sale (a.k.a. a fuels reduction project) to reduce the risk of fire damage to the citizens living in the WUI. This is why he is a black-sheep in the USFS. The USFS does not want the public to learn about Dr. Cohen's research because this would eliminate another excuse to commercially log the national forests. Here is what the most knowledgeable person in the world about fire damage risk reduction methods has to say about the effectiveness of fuels reduction logging: Dr. Cohen states: "Research results indicate that the home and its immediate surroundings within 100-200 feet (30-60 meters) principally determines the home ignition potential during severe wildland-urban fires. Research has also established that fire is an intrinsic ecological process of nearly all North American ecosystems. Together, this understanding forms the basis for a compelling argument for a different approach to addressing the wildland-urban fire problem." (Pg. 1 – abstract) Source for quote above: Wildland-Urban Fire—A different approach <http://www.nps.gov/fire/download/pub_pub_wildlandurbanfire.pdf>
http://www.nps.gov/fire/download/pub_pub_wildlandurbanfire.pdf
Comment: Dr. Cohen states "Research results indicate that the home and its immediate surroundings within 100-200 feet (30-60 meters) principally determines the home ignition potential during severe wildland-urban fires." Why are you spending tax dollars on this fuels timber sale rather than helping the public? Dr. Cohen states: "Extensive wildland vegetation management does not effectively change home ignitability." (Pg. 5) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatme

nt.pdf Comment: Dr. Cohen states “Extensive wildland vegetation management does not effectively change home ignitability.” How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: “As stated, the evidence indicates that home ignitions depend on the home materials and design and only those flammables within a few tens of meters of the home (home ignitability). The wildland fuel characteristics beyond the home site have little if any significance to WUI home fire losses.” (Pg. 5) Source for quote above: Reducing the Wildland Fire Threat to Homes: Where and How Much? Presented as the Fire Economics Symposium in San Diego, California on April 12, 1999. <http://www.fs.fed.us/rm/pubs_other/rmrs_1999_cohen_j001.pdf> http://www.fs.fed.us/rm/pubs_other/rmrs_1999_cohen_j001.pdf Comment: Dr. Cohen states “The wildland fuel characteristics beyond the home site have little if any significance to WUI home fire losses.” How does the timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: “Vegetation management beyond the structure's immediate vicinity has little effect on structure ignitions. That is, vegetation management adjacent to the structure would prevent ignitions from flame exposure; but vegetation management away from the structure would not affect ignition from flame exposure and would not significantly reduce ignitions from firebrands.” (Pg. 4) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states “Vegetation management beyond the structure's immediate vicinity has little effect on structure ignitions.” How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber

sale location? Dr. Cohen states: “Past reports and recommendations as well as experimental research and modeling suggest that W-UI fire-loss mitigation should concentrate on the residence and its immediate surroundings. Any strategy for effectively reducing the W-UI fire problem must initially focus on residential fire resistance.” (Pg. 5 – Conclusion) Source for quotes above: Structure Ignition Assessment can Help Reduce Fire Damages in the WUI Published in Fire Management Notes, Volume 57 No. 4, 1997 <http://www.fs.fed.us/rm/pubs_other/rmrs_1997_cohen_j001.pdf> http://www.fs.fed.us/rm/pubs_other/rmrs_1997_cohen_j001.pdf Comment: Dr. Cohen states “Past reports and recommendations as well as experimental research and modeling suggest that W-UI fire-loss mitigation should concentrate on the residence and its immediate surroundings. How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: “Wildland fuel reduction beyond the home ignition zone does not necessarily change home ignitability; therefore, wildland fuel reduction does not necessarily mitigate the W-UI fire loss problem.” (Pg. 9) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states “wildland fuel reduction does not necessarily mitigate the W-UI fire loss problem.” How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: “Effective landscape fuel reduction does not necessarily prevent W-UI home fire destruction.” (Pg. 10) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest

Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states "Effective landscape fuel reduction does not necessarily prevent W-UI home fire destruction." How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: "Thus, wildland fuel reduction that is effective for reducing the wildland fire intensity might be insufficient for reducing the destruction of highly ignitable homes. In contrast, a low home ignition potential reduces the chances of fire destruction without extensive wildland fuel reduction. These findings indicate that the W-UI home fire loss problem is a home ignitability issue largely independent of landscape fuel reduction issues." (Pg. 10) Source for quote above: What is the Wildland Fire Threat to Homes? Presented as the Thompson Memorial Lecture, April 10, 2000 <http://www.nps.gov/fire/download/pub_pub_wildlandfirethreat.pdf> http://www.nps.gov/fire/download/pub_pub_wildlandfirethreat.pdf Comment: Dr. Cohen states "wildland fuel reduction that is effective for reducing the wildland fire intensity might be insufficient for reducing the destruction of highly ignitable homes." How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: "Vegetation management to prevent ignitions from radiation does not require extensive vegetation removal hundreds of meters from a structure. Our analysis indicated that 40 meters was sufficient for a 20 meter flame height." (Pg. 86 – Conclusions) Source for quote above: Modeling Potential Structure Ignitions from Flame Radiation Exposure with Implications for Wildland/Urban Interface Fire Management Presented at the 13th Fire and Forest Meteorology Conference. Lorne, Australia, 1996 <http://www.firewise.org/resources/files/WUI_HIR/Modelingpotenti

alignitions.pdf> http://www.firewise.org/resources/files/WUI_HIR/Modelingpotentialignitions.pdf Comment: Dr. Cohen states “Vegetation management to prevent ignitions from radiation does not require extensive vegetation removal hundreds of meters from a structure. Our analysis indicated that 40 meters was sufficient for a 20 meter flame height.” How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: “Many scientists and natural resource agencies suggest extensive fuel treatments to reduce the possibility of severe and intense wildfires that could damage ecosystems, destroy property, and take human life (USDA Forest Service, 2000; GAO, 2003a,b). However, there are a number of misconceptions and misunderstandings about fuel treatments and their use as a panacea for fire hazard reduction across the United States (Finney and Cohen, 2003; Franklin and Agee, 2003).” (Pg.1998) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Finney, Dr. Cohen, Dr. Franklin and Dr. Agee agree that ”there are a number of misconceptions and misunderstandings about fuel treatments and their use as a panacea for fire hazard reduction across the United States.” How does the Four Forest Restoration Initiative timber sale differ such that their conclusion is not true in the timber sale location? Dr. Cohen states: “Given the right conditions, wildlands will inevitably burn. It is a misconception to think that treating fuels can ‘‘fire-proof’’ important areas. It would be virtually impossible to exclude fire from most temperate terrestrial ecosystems because ignition sources are prevalent and fuels cannot be eliminated. Ignition is rarely affected by fuel treatment.” (Pg.1998) Source for quote above: Objectives

and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states "It is a misconception to think that treating fuels can ''fire-proof'' important areas." How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in the timber sale location? Dr. Cohen states: "Bessie and Johnson (1995) show weather (fuel moisture and wind) is far more important than fuels in determining fire behavior; reducing fuels may have a limited impact on fire occurrence." (Pg.1999) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Bessie and Dr. Johnson say "weather (fuel moisture and wind) is far more important than fuels in determining fire behavior; reducing fuels may have a limited impact on fire occurrence." How does the Four Forest Restoration Initiative timber sale differ such that their conclusion is not true in the timber sale location? Dr. Cohen states: "Treating fuels to reduce fire occurrence, fire size, or amount of burned area is ultimately both futile and counter-productive." (Pg.1999) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-

Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states “Treating fuels to reduce fire occurrence, fire size, or amount of burned area is ultimately both futile and counter-productive.” How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in this timber sale location? Dr. Cohen states: “It may not be necessary or effective to treat fuels in adjacent areas in order to suppress fires before they reach homes; rather, it is the treatment of the fuels immediately proximate to the residences, and the degree to which the residential structures themselves can ignite that determine if the residences are vulnerable.” (Pg.1999) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states ““It may not be necessary or effective to treat fuels in adjacent areas in order to suppress fires before they reach homes; rather, it is the treatment of the fuels immediately proximate to the residences.” How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in this timber sale location? Dr. Cohen states: “Thinning to reduce crown fire potential requires careful evaluation of the tradeoffs in treatment effects on potential surface fire behavior and crown fire behavior (Scott and Reinhardt, 2001). Thinning will often result in increased potential surface fire behavior, for several reasons. First, thinning reduces the moderating effects of the canopy on windspeed, so surface windspeed will increase (Graham et al., 2004). It also results in increased solar radiation on the forest floor,

causing drier surface fuels. It may also cause an increase in flammable grassy and shrub fuels over time, due to the reduced tree competition." (Pg.2000) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen says "Thinning will often result in increased potential surface fire behavior." How does the Four Forest Restoration Initiative timber sale differ such that his conclusion is not true in this timber sale location? Dr. Cohen states: "Some viable fuel treatments may actually result in an increased rate of spread under many conditions (Lertzman et al., 1998; Agee et al., 2000). For example, thinning to reduce crown fire potential can result in surface litter becoming drier and more exposed to wind. It can also result in increased growth of grasses and understory shrubs which can foster a rapidly moving surface fire." (Pg.2000) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Lertzman et al., 1998; Agee et al. state, "Some viable fuel treatments may actually result in an increased rate of spread under many conditions." How does the Four Forest Restoration Initiative timber sale differ such that their conclusion is not true in this timber sale location? Dr. Cohen states: "Treating fuels may not improve ecosystem health. Ecosystem restoration

	treatment and fuel treatment are not synonymous. Some ecosystem restoration treatments reduce fuel hazard, but not all fuel treatments restore ecosystems. Ecosystem restoration treatments are often designed to recreate presettlement fire regimes, stand structures and species compositions while fuel treatment objectives are primarily to reduce fuels to lessen fire behavior or severity—this is known as ''hazard Reduction.'' Achieving fuel hazard reduction goals in the absence of ecosystem restoration is insufficient (Dombeck et al., 2004; Kauffman, 2004).” (Pg.2000) Source for quote above: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 <http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf> http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf Comment: Dr. Cohen states “Ecosystem restoration treatment and fuel treatment are not synonymous.” How does the Four Forest Restoration Initiative timber sale differ such that Dr. Cohen’s conclusion is not true in this timber sale location?	
Artley, Dick	Dr. Ingalsbee and Dr. Fox state: “We cite evidence that logging-induced changes in fuel composition, vegetation, and microclimate can result in increased rate of fire spread, higher fireline intensity, and more severe fire effects.” (Abstract-2nd paragraph) Source for quote above: Fuel Reduction for Firefighter Safety Published in Proceedings of the International Wildland Fire Safety Summit Winthrop, WA, Oct. 26-29, 1998 <http://www.fusee.org/docs/fuelbreaks/fuel_reduction_copy.htm> http://www.fusee.org/docs/fuelbreaks/fuel_reduction_copy.htm Comment: Dr. Ingalsbee and Dr. Fox say “logging-induced changes in fuel composition, vegetation, and microclimate can result in increased rate of fire spread, higher fireline intensity, and more severe fire effects.” What scientific evidence does the Responsible Official have showing this is untrue? Dr. Ingalsbee states: “Time does not permit me to go into details about the prescriptions for the	(8-28) The fire ecology specialists report discloses the following " Decreasing the horizontal and vertical continuity of canopy fuels (direct effect) would allow sunlight to reach the surface, increasing surface temperatures, and decreasing dead fuel moisture content at the surface. his, combined with increased surface winds with fewer trees blocking the wind, would increase surface fire intensity, flame length, and rate of spread even if surface fuels were the same before and after thinning (Omi and Martinson 2004,Scott 2003). Therefore, canopy fuel treatments reduce the potential for crown ire (indirect effect) at the expense of slightly increased surface fire behavior (fireline intensity, flame length, and rate of spread). However, critical levels of fire behavior (limits of manual or mechanical control) are less likely to be reached in stands treated to withstand crown fires, as all crown fires are uncontrollable. Although surface intensity may be increased after treatment, a fire that remains on the surface beneath a timber

	HazRed project, but the community "freaked out" when they saw the results of the timber marking crew: over 8,000 trees over 20 inches DBH marked for cutting, including a couple rare 6 foot DBH sugar pines. The community felt that HazRed was essentially a timber sale functioning as a "Trojan Horse" to set the precedent for commercial logging in an improper place using fuels reduction as an illegitimate excuse." Source for quote above: "Analysis Paralysis" to Agency-Community Collaboration in Fuels Reduction for Fire Restoration: A Success Story From an Oral presentation to the Conference on Fire, Fuel Treatments and Ecological Restoration: Proper Place, Appropriate Time, April 18, 2002 Fort Collins, CO <http://www.fire-ecology.org/research/FtCollins_speech.html> http://www.fire-ecology.org/research/FtCollins_speech.html Comment: The public detests commercial logging in their national forest land, especially when the reason given for the logging does not	stand is generally more controllable (Scott 2003). (Fire ecology specialist report for DEIS, p131-132), which is what the author has stated, without the statement concerning crown fire. The fire ecology analysis on fire behavior is located on page 149 to page 165 of the web-based DEIS. The analysis states, "Table 58 displays post-treatment fire behavior at the landscape scale for alternatives B, C, and D. In alternative B, the potential for crown fire at the landscape (treatment area) scale would be reduced from 34 percent to 5 percent. Alternative C best reduces the crown fire potential to 4 percent. Alternative D reduces crown fire potential the least (7 percent). The reference to the HazRed fuels reduction project is not germane to the 4FRI restoration project.
Artley, Dick	help them during a wildfire. Dr Agee states: "large, severe wildfires are more weather-dependent than fuel-dependent," Source for quote above: "The Severe Weather Wildfire-Too Hot to Handle?" Northwest Science, Vol. 71, No. 1, 1997 <http://www2.for.nau.edu/courses/pzf/FireEcolMgt/Agee_97.pdf> http://www2.for.nau.edu/courses/pzf/FireEcolMgt/Agee_97.pdf Comment: The Four Forest Restoration Initiative timber sale removes fuels to reduce wildfire severity and rate of spread in spite of what Dr. Agee says. Why is his statement that fires are more weather –	(8-29) Thank you for your opinion. (8-30)This quote, from a 1997 article, is taken out of context and misused. The full text reads: "Recent statements in the scientific literature and popular press suggest that recent large, severe wildfires in western North America are largely due to extreme weather. The long-accepted view of fire behavior as a function of fuels, weather, and topography has changed for some from an equilateral fire triangle, where each factor can be significant, to a distorted isosceles triangle with the wide base being the weather contribution to fire behavior. This "weather hypothesis" that all large, severe wildfires are more weather-dependent than fuel-dependent (emphasis added) is found in
Artley, Dick	dependent than fuel-dependent not the case here? Dr. Alison states: "One reason that fuels reduction treatments should be limited is that they may not address the important effects of climate and weather on fire behavior. Some studies suggest that it is drought and warmer temperatures—not fuels accumulations—that are the major explanatory factors for large fires (O'Toole 2002-2003, Pierce et al. 2004). It is an unrealistic goal to return all forests to historical states, in light of the fact that agencies have no control over drought or temperature." (pgs. 15 – 16) Source for quote above: "Forest Policy Up in Smoke: Fire Suppression in the United	statements such as the following:..." (8-31) The purpose and need of the project is disclosed within Chapter 1 of the DEIS, it is not fuels reduction as the quote from Dir. Allison states within the comment. The disclosure of fire effects of the proposed action based on the desired conditions of the project are disclosed in the fire ecology section of the DEIS p 149-165 and the fire
Artley, Dick	States." A PERC publication, 2007	ecology specialists report.

	<http://www.law.northwestern.edu/searlecenter/papers/Berry_forest_policy.pdf> http://www.law.northwestern.edu/searlecenter/papers/Berry_forest_policy.pdf Comment: The Four Forest Restoration Initiative timber sale removes fuels to reduce wildfire severity and rate of spread in spite of what Dr. Alison says. Why is his statement that fires are driven by climate and weather not the case here? Dr. Bessie and Dr. Johnson state: "Fire intensity was correlated to annual area burned; large area burned years had higher fire intensity predictions than smaller area burned years. The reason for this difference was attributed directly to the weather variable frequency distribution, which was shifted towards more extreme values in years in which large areas burned. During extreme weather conditions, the relative importance of fuels diminishes since all stands achieve the threshold required to permit crown fire development. This is important since most of the area burned in subalpine forests has historically occurred during very extreme weather (i.e., drought coupled to high winds). The fire behavior relationships predicted in the models support the concept that forest fire behavior is determined primarily by weather variation among years rather than fuel variation associated with stand age." Source for quote above: "The Relative Importance of Fuels and Weather on Fire Behavior in Subalpine Forests" Ecology, Vol. 76, No. 3 (Apr., 1995), pp. 747-762. Published by the Ecological Society of America <http://www.jstor.org/pss/1939341> http://www.jstor.org/pss/1939341 Comment: The Four Forest Restoration Initiative timber sale removes fuels to reduce wildfire severity and rate of spread in spite of what Dr. Bessie and Dr. Johnson say. Why are their statements that fires are driven by	
Artley, Dick	drought and high winds not the case here? Dr. Kelly states: "There is a gathering body of evidence that large wildfires are not determined by "unnatural" fuel loading. Lodgepole pine, subalpine fir, and aspen depend on infrequent, stand-replacing, high intensity fires. Most of the B-D NF is well within the natural range of variability. In fact, dense forest stands may not be caused by fire exclusion, but by a series of consecutive wet years that boosted	(8-32) Information on the science that was used for the fire analysis is presented in the Fire Ecology and Air Quality specialists' report. The cited article dealt with subalpine forests and was not relevant to the 4FRI analysis area. (8-33) The citation comes from opinion piece describing conditions on the Beaverhead-Deer lodge NF in Montana in a completely different ecosystem and fire regime. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Officials to consider. With that being said, the 4FRI
Artley, Dick	seedling survival and expanded the local range. Drought, wind, and	

	low humidity, not fuels loads, drive large wildifires. Weather and climatic conditions are also the driving force behind expanding insect populations." Source for quote above: "Cheap Chips, Counterfeit Wilderness: Greenwashing Logging on Montana's Biggest National Forest." Published by the World Prout Assembly, 2007 <http://www.worldproutassembly.org/archives/2007/12/cheap_chips_cou.html> http://www.worldproutassembly.org/archives/2007/12/cheap_chips_cou.html Comment: The Four Forest Restoration Initiative timber sale removes fuels to reduce wildfire severity and rate of spread in spite of what Dr. Kelly says. Why are Dr. Kelly's statements that fires are driven by drought, wind, and low humidity not the case here? Also how will you replicate the fire benefits to the natural resources that exist in your timber sale area if the fires don't occur?	project recognizes the crucial role of fire to ponderosa pine ecosystems in the southwest (see desired condition on page 24 of the DEIS).
Artley, Dick	Dr. Partridge states: "The current focus on 'fuels' is, in itself, misguided because almost anything in a forest will burn, given the right conditions. Any fire specialist will tell you that the principal factors affecting fire are temperature and moisture, not fuels. No legislation will prevent or even reduce fires in the vast areas of the national forests and to pretend so is fraudulent." Source for quote above: Testimony to the Agriculture, Nutrition and Forestry Committee United State Senate. Hearing to Review Healthy Forests Restoration Act, HR 1904 June 26, 2003 <http://www.univision.co.za/offer-day-oA2A392Cr1N3B2x_2F2du3g3-music.shtml> http://www.univision.co.za/offer-day-oA2A392Cr1N3B2x_2F2du3g3-music.shtml Comment: The Four Forest Restoration Initiative timber sale removes fuels to reduce wildfire severity and rate of spread in spite of what Dr. Partridge says. Why are Dr. Partridge's statements that fires are driven by temperature and moisture not the case here?	(8-34) While the link given does, in fact, take one to a Univision website, there was no link that appeared to apply to anything relating to fire, fuels, forests, or the USFS. As such, there was insufficient information available to evaluate this comment. Even with not being able to find the link, the comment refers to fuels reduction and not restoration, as is outlined in the purpose and need in Chapter 1 of 4FRI DEIS, thus would not be germane to the analysis.
Artley, Dick	Dr. Mike Dombeck states: "The priority for fuels management should be the wildland-urban interface (WUI) and municipal watersheds, not fire-burned trees in the backcountry. Source for quote above: "Wildfire Policy and Public Lands: Integrating Scientific Understanding with Social Concerns across Landscapes" Published in: Conservation Biology Volume 18, No. 4, August 2004, page 887	(8-35) The objectives of the Four Forest Restoration Initiative are about restoring ponderosa pine forests; it is not a fuels reduction project (DEIS purpose and need, p 8-29). In ponderosa pine, there is an overlap between restoration treatments and fuels reduction treatments. For example, fuels treatments often include thinning stands so trees that are evenly spaced, and 'thinning from below'. While that may change

	<http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/FireScienceResearch/FireEcology/FireEcology-Dombeck04.pdf> http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/FireScienceResearch/FireEcology/FireEcology-Dombeck04.pdf Comment: The Four Forest Restoration Initiative timber sale is precisely what USFS Chief Dombeck says should not occur because the cost is high and it does not reduce the fire damage risk for people living in the WUI.	potential fire behavior and effects to something closer to the natural fire regime for a decade or so (most fire potential is reduced to low severity effects), it is not a restoration treatment, and is not intended to set the treated area on a trajectory towards more historic patterns, composition and structure. Unlike many fuels treatments, the restoration treatments proposed by the 4FRI address the structure of the entire forest – vertically and horizontally, which changes fire behavior and effects, while putting the forest on a trajectory towards a more resilient, historic condition. Thinning of both canopy and ladder fuels is generally needed to reduce crown fire potential. Fire behavior is a primary objective in NEPA projects for which the primarily purpose is fuels reduction, and improved fire effects are a side-benefit of addressing fire behavior. Fire effects are a primary objective when restoration is the purpose of the project and, in ponderosa pine; decreased fire behavior is a side-benefit of restoration treatments. Only 535 acres of WUI 'fuel treatments' proposed in this project. All other treatments are restoration treatments. Treatments were designed based on soil types, landscape patterns, land designations, and other considerations, including potential fire effects and behavior.
Artley, Dick	Dr. Schoennagel, Dr. Veblen and Dr. Rommie state: "Variation in daily area burned was highly correlated with the moisture content of 100-hour (2.5- to 7.6- cm diameter) and 1000-hour dead fuels (Turner et al. 1994). Once fuels reached critical moisture levels later in the season, the spatial pattern of the large, severe stand replacing fires was controlled by weather (wind direction and velocity), not by fuels, stand age, or firefighting activities (Minshall et al. 1989,Wakimoto 1989, Turner et al. 1994)." (Pg. 666) Source for quote above: "The Interaction of Fire, Fuels, and Climate across Rocky Mountain Forests" Bioscience, July 2004 / Vol. 54 No. 7 <http://www.montana.edu/phiguera/GEOG430/PurdyFireFieldTrip/Schoennagel_et_al_2004_Bioscience.pdf> http://www.montana.edu/phiguera/GEOG430/PurdyFireFieldTrip/Schoennagel_et_al_2004_Bioscience.pdf Comment: In the response to comments in the final NEPA document please tell the public why Dr. Schoennagel, Dr. Veblen and Dr. Rommie are wrong when they all agree that "once fuels reached critical moisture levels later in the season, the spatial pattern of the large, severe stand replacing fires	(8-36) The quote is taken from an article discussing spruce/fir or lodge pole pine forests and applies to that ecosystem and does not apply to 4FRI analysis area that is ponderosa pine (see fire ecology specialists report pages 28-48 for a discussion of the fire regime and fire return interval for the project area). In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

	was controlled by weather (wind direction and velocity), not by fuels or stand age." Dr. Schoennagel and her research team conclude: "We assessed the extent to which these treatments were conducted in and near the wildland–urban interface (WUI), where they would have the greatest potential to reduce fire risk in neighboring homes and communities. Although federal policies stipulate that significant resources should be invested in the WUI, we found that only 3% of the area treated was within the WUI, and another 8% was in an additional 2.5-km buffer around the WUI, totaling 11%." Source for quote above: "Implementation of National Fire Plan treatments near the wildland–urban interface in the western United States" from Proceedings of the National Academy of Sciences, May 1, 2009 <http://spot.colorado.edu/~schoenna/images/Schoennagel_2009_PNAS_NFP.pdf> http://spot.colorado.edu/~schoenna/images/Schoennagel_2009_PNAS_NFP.pdf Comment: Dr. Schoennagel is a research scientist in CU-Boulder's geography department. Her research team included Dr. Cara R. Nelson, Dr. David M. Theobaldc, Dir. Gunnar C. Carnwathb, and Dr. Teresa B. Chapmana. The Responsible Official should not ignore their conclusion that most fuels reduction timber sales are located far from the WUI where they are much less likely to reduce the risk that	
Artley, Dick	homes located in the WUI will burn.	Again, the 4FRi project is not a fuels reduction or WUI specific treatment as the comment suggests--it is a landscape scale restoration (see DEIS purpose and need p 8-29) project that is very different from fuels reduction. Please see comment 8-27 and response 213 for a discussion of the difference between restoration and fuels reduction.
	Matthew Koehler states: "As news reports about the wildfires came in from the western U.S. during August of 2000, Mark Rey must have seen some opportunity among the flames. That's because Mark Rey, the timber industry and the Forest Service recognize that the wildfires of 2000 may perhaps be their last real opportunity to return to the glory days of the Reagan Administration, when taxpayer-subsidized logging and roadbuilding dominated our national forests - regardless of the consequences. And regardless of the truth. At the time of the 2000 wildfires, Rey - a former timber industry lobbyist with the unique knack for finding excuses to "get the cut out" - was serving as a staff member for the U.S. Senate Committee on Energy and Natural Resources. In this capacity, Rey was the brains behind staunchly pro-timber Senator Larry Craig's (R-ID) efforts to	
Artley, Dick	dramatically increase logging and roadbuilding on America's national	(8-38) This is a position, opinion paper regarding environmental policy. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

	forests." Source for quotes above: "Mark Rey Wants to Take Our Forests Away Author: Matthew Koehler A Native Forest Network publication, 2003 <http://www.nativeforest.org/campaigns/public_lands/rey1_5_30_02.htm> http://www.nativeforest.org/campaigns/public_lands/rey1_5_30_02.htm Comment: The public expects the men and women who they pay to care for their national forests to understand how national policies created by a timber lobbyist (Mark Rey) appointed by bush to increase the cut from national forests is still driving the agency to do things the public abhors. The Mother Jones magazine concludes: "While most environmentalists do not argue with the basic approach, they charge that too many old, large trees are being cut down under this rubric of "fuels reduction," and that federal land managers are allowing commercial logging operations to cut too many large trees too far from cities or towns, where the clearing has no real impact on human safety." " "It's a classic bait-and-switch," says Timothy Ingalsbee, director of the Western Fire Ecology Center, an Oregon-based advocacy group. "They want to do commercial logging and call it fuels reduction." " Source for quotes above: "Fight Fire With Logging? Published in Mother Jones, July 31, 2002 <http://www.motherjones.com/politics/2002/08/fight-fire-logging> http://www.motherjones.com/politics/2002/08/fight-fire-logging	
Artley, Dick	Comment: The Four Forest Restoration Initiative project directly contradicts the truths stated by a person with a Ph.D. who specializes in fire and protection from fire damage,	(8-39) Thank you for your opinion. See chapter 1 of the DEIS for the purpose and need for this project that is clearly not fuels reduction. Also, 4FRI is not proposing cutting old trees (see Old Tree Implementation Plan Section C, Appendix D p 644-45 of the DEIS).
Artley, Dick	Of course we all know President Bush felt that managing a national forest to maintain a fully functioning, healthy forest ecosystem was nonsense because it restrained the resource extraction corporations from having their way with public land for short term profit. This is why he installed timber lobbyist Mark Rey as Undersecretary of Agriculture. Rey was directed to set USFS policy that would result in more national forest logging. Rey capitalized on the fires of 2000 and 2002. He conjured up the need to "remove hazardous fuels." The public still believes that fuels reduction logging near the WUI is an effective way to reduce the risk of fire damage.	(8-40) In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

Artley, Dick	If the final EIS for the Four Forest Restoration Initiative project does not analyze a Dr. Cohen alternative in detail it will be necessary to inform the public in your area about Dr. Cohen's superior fire risk reduction methods myself. I'll tell the public in your area that you have chosen not to act to protect the safety and homes of the people who live in the WUI. We both know that USFS national leaders abhor bad press … and deal harshly with USFS line-officers whose actions were exposed in the newspapers and were the basis for the bad press. My Pending Media Contact If the final EIS is released to the public with no Dr. Cohen fire risk reduction methods alternative analyzed in detail near the WUI I will write an letter to the editor briefly describing Dr. Cohen's fire damage reduction methods that the Responsible Official refuses to analyze. My letter will contain the link to the WEB site which explains Dr. Cohen's methods. Dr. Cohen's WEB site shows photos of post-fire conditions. The most striking photo shows several homes that were unburned where the fine fuels were removed per Dr. Cohen's recommendations and the rest of the homes burned to the ground. It will be pointed out that prior to the fire the USFS had removed hazardous fuels on national forest land adjacent to the WUI areas where the burned homes were located. My letter will suggest that the public contact Regional Forester Zepeda (505-842-3306) or <mailto:gzepeda@fs.fed.us> gzepeda@fs.fed.us and ask why he believes volume accumulation and creating private industrial tree farm conditions is a higher priority than human lives and assets. Indeed, it sells newspapers when they publish articles about corrupt Federal agency employees who use taxpayer dollars to prepare projects that provide opportunities for corporations to reap massive profit at the expense of the public Start reading: Arizona Daily Sun, Navajo Hopi Observer, Williams News, Lake Powell Chronicle, Grand Canyon News, and Kingman Daily Miner. We both know the USFS will do anything to avoid bad press which will occur after my letters are published. Any USFS line-officer who trades off public safety so they can create industrial tree farm conditions and supply volume to their corporate masters should not be working for the USFS. In your spare time read the truth contained at the link below. The evidence is clear. Mark Rey capitalized on the fires of 2000 and 2002 to	(8-41) Thank you for your position statement. The article cited is an opinion piece that discusses the effectiveness of fuels treatments at stopping wildfire. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. Regarding recommendations from Jack Cohen see our complete response in comment letter 221.

	guarantee more timber sales for the corporations he lobbied for prior to Bush appointing him to Undersecretary of Agriculture. "Why the National Fire Plan is a Trojan Horse for Logging--Burning Questions" By George Wuerthner Ph.D. Published by CounterPunch, June 12-14, 2009 <http://www.counterpunch.org/2009/06/12/burning-questions/> http://www.counterpunch.org/2009/06/12/burning-questions/ ----------	
Artley, Dick	The Four Forest Restoration Initiative Timber Sale is Inconsistent with what the American Public wants in their National Forests The following quote comes from forest service publication that describes what the public wants from their national forests: "The public sees the restriction of mineral development and of timber harvest and grazing as being more important than the provision of natural resources to dependent communities (although this is still seen as somewhat important)." (Pg. 28) Source: "Survey results of the American public's values, objectives, beliefs, and attitudes regarding forests and grasslands: A technical document supporting the 2000 USDA Forest Service RPA Assessment". Gen. Tech. Rep. RMRS-GTR-95. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 111 p. Link to Complete Report: <http://www.fs.fed.us/rm/pubs/rmrs_gtr095.pdf> http://www.fs.fed.us/rm/pubs/rmrs_gtr095.pdf Comment: This timber sale is inconsistent with what the public wants the agency employees administering the national forest to do as documented in the USFS-authored document: Gen. Tech. Rep. RMRS-GTR-95. Explain why you feel that you have been given the authority to violate the public trust.	(8-42) Thank you for your opinion. Again, the project is a landscape scale restoration project, and not a timber sale.
Artley, Dick	Comment: There is no "timber famine" as the USFS has been so fond of predicting for many decades. There is no shortage of raw materials for paper and wood products in the United States otherwise the owners of private timberland would not be exporting their lumber. The public doesn't want their public land logged and there is no economic need to log the trees. Therefore the Responsible Officials are logging to: 1) further their careers by attempting to meet the Regional Forester's volume expectations, and 2) spend every penny of timber $$ to assure a similar timber allocation next year.	(8-43) Thank you for your opinion. Again, the project is a landscape scale restoration project, and not a timber sale.

		(8-44) The effects of herbicide use were analyzed and disclosed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005) for the Kaibab and Coconino NFs. The analysis was incorporated into the Coconino NF Forest Plan as Amendment 20. In the previous Kaibab NF Forest Plan, the analysis and decision had been incorporated as amendment 7. This analysis tiers to the noxious weeds FEIS and decision. The Noxious or Invasive Weed EIS evaluated the impacts of glyphosate based herbicides and proposed restrictions on the use of these chemicals within limited spray zones (buffers around human habitation and recreation sites), near water and other critical wildlife habitat areas. Restrictions and extra protective measures are outlined in the Appendix B -Design Features, Best Management Practices, Required Protection Measures, and Mitigation Measures of the weed EIS. BMP B15 (web-based DEIS, page 567) incorporates the weeds mitigation measures (appendix B of the weed EIS) in their entirety. The DEIS (page 256) references the incorporation of Appendix B of the Weed EIS into Forest Plan Amendments 20 (CNF) and 7 (KNF). In the FEIS, this language has been updated to reflect a new Kaibab NF Land and Resource Management Plan (USDA FS 2014). While the direction provided in the noxious weeds FEIS still provides direction, it is no longer incorporated into the forest plan. [PC1]corrected page number – Saturday edit
Artley, Dick	Herbicides containing Glyphosate, Methyl Parathion, Triclopyr, Imazapyr, and Imidacloprid must Never be used on Public Land for Any Reason Under the Proposed Action Table 16 states the following phrase several times: “remove noxious weeds.” Beginning at page 256 the DEIS discusses Noxious and Invasive Weeds. If herbicides will be applied the public will want to know where and the type of herbicide that will be applied. Why? The research shows the herbicides listed above are lethal to some species. Comment: Please expand the description of the proposed action to describe the types of herbicide that will be applied and the exact location of this application with a map of sufficiently small scale that the public can easily locate and avoid these areas.	
Artley, Dick	Comment: The chemicals listed above kill aquatic life even if the concentrations of the chemical in water are very low. Fish deaths will occur in the streams in the project area and the herbicide toxicity will extend many miles downstream. Herbicides must never be allowed to contact water … even so-called aquatic-safe herbicides. These chemicals are also quite toxic to mammals (including humans), birds and insects. Under some conditions they are lethal. They cause: · birth defects · non-Hodgkin’s lymphoma · mitochondrial damage · cell asphyxia · miscarriages · attention deficit disorder · endocrine disruption · DNA damage · skin tumors · thyroid damage · hairy cell leukemia · Parkinson disease · premature births · decrease in the sperm count · harm to the immune system in fish · death of liver cells · severe reproductive system disruptions · chromosomal damage	(8-45) Please response to comment #8-44. The aquatics analysis (web-based DEIS, page 245 to page 255) concluded BMPs would be in place to mitigate short-term risks (see Roundtail Chub, Spikedace and Loach Minnow, Longfin Dace, Desert Sucker, Sonora Sucker, California Floater and macroinvertebrates).
Artley, Dick	Comment: Please comply with 40 C.F.R. § 1502.9(a) by responding to	(8-46) Each attachment was assigned a comment letter numbers and

	each opposing view in Attachments #9a and #18.	responded to. See the responses associated with comment letters #216-#224.
Artley, Dick	Would you spray these chemicals on your yard prior to letting your grandchildren play in the grass? After reading the statements in the attachments written by unbiased, independent scientists referenced above do you have 100% trust in your FP Amendment #20 based on the outdated 2005 three-forest noxious weed FEIS/ROD written using safety data provided by a lab paid by the herbicide manufacturer to conduct safety analysis? Of course noxious weeds and non-native invasive plant species are a huge problem on public lands, but please use alternatives to chemicals in spite of the fact it costs more.	(8-47) The Forests will use several methods of control including manual, mechanical, cultural, and biological and herbicide treatment. These were analyzed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005). One or more methods may be used on any particular site depending on localized conditions and the species of weeds being treated.
Artley, Dick	This Timber Sale Proposes to Assault my Forest. The Proposed Actions are Clearly Intended to Please the Logging Corporations at the Expense of the Forest's Biodiversity by Attempting to Eliminate Natural Disturbance Events · Fire is supposed to occur in the general forest to benefit the species that depend on a post-fire landscape. Nothing must be done to short-circuit this natural phenomena unless it's close to the WUI.	(8-48) Thank you for your comment. A key objective of this project is to return fire to the fire-adapted ponderosa pine ecosystem, see DEIS, chapter 1.
Artley, Dick	Insect activity is not harmful to the infinite natural resources in the forest. These insects benefit many natural resources in ways that cannot be duplicated by man. The only land managers (I use the term "managers loosely) who believe insects are destructive are those (like Williams and Stewart) who believe their prime directive as forest supervisors is to assure the fewest merchantable trees are lost to natural disturbance events as possible. How else will they serve their masters?	(8-49) The desired condition (web-based DEIS, p. 18) states, "The desired condition is to move towards a forest structure that would allow beetles and dwarf mistletoe to function at naturally occurring or historic levels. There is a need to manage insect and disease in a manner that reduces, but does not eliminate bark beetle or dwarf mistletoe in order to provide nesting, resting, foraging, and catching sites for birds and mammals including Abert's/tassel-eared squirrels".
Artley, Dick	The tragic 4FRI proposal will cut and remove dead and dying trees. Here again the natural resource benefits provided by the decomposition of these trees in the woods cannot be duplicated by man.	(8-50) The analysis identified design features for protecting snags, logs, trees with dead tops, cavities and lightning strikes wherever possible to provide cavity nesting/foraging habitat (web-based DEIS, W32-W35, pp. 595-596).
Artley, Dick	Comment: Please comply with 40 C.F.R. § 1502.9(a) by responding to each opposing view in Attachments #8, #5 and #14.	(8-51) See response 8-46.
Artley, Dick	Conclusion Please notify this member of the public when the ROD and final EIS are posted online and the NOA has been published in the Federal Register. Better yet, withdraw the project.	(8-52) You will be notified when the FEIS and draft ROD become available.
Artley, Dick	Final Comment #1 Supervisors Stewart and Williams, you know what	(8-53) No response needed.

	you have just read is true. You also know this is not a difficult choice: either act according to the USFS timber agenda, fit well into the USFS timber culture, and maintain your promotion potential, or take action to assure that the kids born in 2050 don't inherit public land that mimics industrial tree farm conditions which will be devoid of the recreational opportunities they deserve.	
Artley, Dick	Final Comment #2 You prove to the American public that an illegal NEPA document can have any number of pages. Don't think you can hide behind 744 pages of worthless text.	(8-54) No response required.
	Final Comment #3 When this project is litigated it will receive national media attention. The public will be assured that the Coconino, Kaibab, Apache-Sitgreaves and Tonto National Forests are wholly owned subsidiaries of the timber corporations in Arizona. Anyone associated with the 4FRI EIS can forget ever being promoted to another national forest where they strive to obey the law and serve the public. This includes the pathetic members of the IDT who sold their values and ethics for $$$$$$$$$$$$$$. No forest supervisor who strives to protect and conserve the natural resources he/she is responsible for would have you! Most of you receiving these comments probably know this sordid attempt to cover 10-years worth of timber sales on 4 national forests originated in the Chief's office as a test case. It has been planned for several years. Now the good names of the IDT members are being used to help finalize this precedent-setting gift to the timber industry. This is Tidwell's career slap in the face of the American people. I suggest you all become familiar with the Project on Government Oversight (POGO) at: <http://www.pogo.org/> http://www.pogo.org/ Those of you who care about the natural resources on your forests and want to stop this atrocity without jeopardizing your jobs may want to visit: <http://www.whistleblowers.org/index.php?option=com_content&task=view&id=840&Itemid=169> http://www.whistleblowers.org/index.php?option=com_content&task=view&id=840&Itemid=169 Finally, remember Governor Brewer does not represent the American public who want no further	
Artley, Dick	development of their national forests.	(8-55) No response required.
Artley, Dick	I have about 2.5 more days worth of work to notify citizens and	(15-1) Thank you for your comment.

Artley, Dick	groups in the western United States who don't want their recreation areas trashed to provide: 1) opportunities for corporate profit, and 2) greater promotion potential for line-officers in your area who "get out the cut." My guess is that the 4FRI Record of Decision will receive at least 60 appeals. About 15% of these appeals will be filed by groups and a few individuals who have the resources to sue Williams and Stewart after the ADO denies their appeals. Scott, please answer one question. Has a high GS salary caused you to loose your values. or were you deceiving people on the Nez Perce NF that you had natural resource values. I look forward to your reply. As a communal owner of the Coconino, Kaibab, Tonto and Apache-Sitgreaves National Forests I am saddened that the Responsible Official is proposing to cause long-term harm to my natural resources using my tax dollars to prepare this corporate-friendly project that destroys the proper functioning of important natural resources in (and downstream) the sale area for many years.	(8-56) Thank you for your comment.
Artley, Dick	"large, severe wildfires are more weather-dependent than fuel-dependent,"	(216-1) The quoted statement was taken out of context; the paper implies the opposite (of the quoted statement) in regards to the project.
Artley, Dick	"The biggest ecological con job in years is being waged by the U.S. Republican party and their timber industry cronies. They are blaming the recent Western wildfires on environmentalists, and assuring the public that commercial logging will reduce the risk of catastrophic wildfires."	(216-2) This is a newspaper article on political views. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"One reason that fuels reduction treatments should be limited is that they may not address the important effects of climate and weather on fire behavior. Some studies suggest that it is drought and warmer temperatures-not fuels accumulations-that are the major explanatory factors for large fires (O'Toole 2002-2003, Pierce et al. 2004). It is an unrealistic goal to return all forests to historical states, in light of the fact that agencies have no control over drought or temperature." (pgs. 15 - 16)	(216-3) The DEIS states clearly that the project is a landscape scale restoration project (DEIS p8-29), and not a fuels reduction project.
Artley, Dick	"Fire intensity was correlated to annual area burned; large area burned years had higher fire intensity predictions than smaller area burned years. The reason for this difference was attributed directly to the weather variable frequency distribution, which was shifted towards more extreme values in years in which large areas burned.	(216-4) Information on the science that was used for the fire analysis is presented in the Fire Ecology/Air Quality specialist report. The paper isn't relevant to the project area because it is discussing alpine ecosystems that are not relevant to the project area.

Artley, Dick	During extreme weather conditions, the relative importance of fuels diminishes since all stands achieve the threshold required to permit crown fire development. This is important since most of the area burned in subalpine forests has historically occurred during very extreme weather (i.e., drought coupled to high winds). The fire behavior relationships predicted in the models support the concept that forest fire behavior is determined primarily by weather variation among years rather than fuel variation associated with stand age." "Climatic conditions drive all big fires- not fuels. All substantial fires occur only if there is extended drought, low humidity, high temperatures and, most importantly, high winds. When conditions are "ripe" for a large blaze, fires will burn through all kinds of fuel loads. For this reason, most fires go out without burning more than a few acres; approximately 1 percent of all fires are responsible for about 95 percent to 99 percent of the acreage burned." "Under severe conditions, fires burn through all kinds of fuel loads including thinned/logged forests. Contrary to what the U.S. Forest Service has stated about the Ojo Peak Fire, local witnesses have said the fire blew right through the hotter, drier thinned forests where the cooling effect of forest canopy had been removed."	(216-5) This appears to be mostly an opinion piece, as there are no citations, no specific references to studies, and no data presented. The intent of restoration treatments is not to stop fires but to decrease the intensity and the likelihood of uncharacteristic fire behavior and effects. The fire ecology section of the DEIS and fire ecology specialist report discuss the role of fire in the 4FRI project area.
Artley, Dick	"The Forest Service is using the fear of wildfires to allow logging companies to remove medium-and large-diameter trees that they can sell, rather than just the small trees and brush that can make fires more severe. There is little evidence to show that such logging will prevent catastrophic fires; on the contrary, logging roads and industrial logging cause wildfires. Bush is a well known supporter of the timber industry and has accepted huge sums of money from wealthy timber company leaders. He is promoting misinformation about forest fires in order to benefit timber industry campaign contributors."	(216-6) This is an opinion piece in a newspaper article / newsletter regarding policies of the Bush Administration. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"As someone with first-hand experience in fire hazard reduction and first-hand knowledge of the forest management field, as well as someone with lifelong roots in the Durango community, I am abhorred by the destruction, nearly amounting to clear cutting, that is taking place around our community under the guise of "fire hazard reduction."	(216-7) This is an opinion piece in a newspaper article / newsletter regarding environmental policies and fuel treatments. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"First, most large fires are climatic/weather driven events, not fuels	(216-8) This is an opinion piece in a newspaper article / newsletter

	driven. Extended drought, high winds, high temperatures and low humidity enable fires to burn through all fuel loadings. Many of the large Western fires in recent years were in forests that had been previously logged and/or thinned, with little apparent effect on fire spread or severity	regarding environmental policies and fuel treatments. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. The fire ecology report describes how past disturbances and projects have influenced the existing condition for this project. See pages 28-50 and 228-236.
Artley, Dick	"most large fires are climatic/weather driven events, not fuels driven. Extended drought, high winds, high temperatures and low humidity enable fires to burn through all fuel loadings."	(216-9) This is an opinion piece in a newspaper article / newsletter regarding environmental policies and fuel treatments. We could not find anything that would influence this analysis.
Artley, Dick	"The primary driver of fire is not beetle kill. It's climate," said Barry Noon, a wildlife ecology professor at Colorado State University and an author of the report. "It's drought and temperature." "The report was authored by Noon; Clark University professor Dominik Kulakowski ; Scott Black, executive director of the Xerces Center for Invertebrate Conservation and Dominick DellaSala, president and chief scientist for the National Center for Conservation Science and Policy."	(216-10) The treatments proposed by the 4FRI are restoration treatments, and fire behavior and the prevention of beetle outbreaks is not a primary objective. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is “to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity.” In the Fire Ecology/ Air Quality report, climate change is discussed on pages 222 – 226.
Artley, Dick	"Extensive areas of dead trees have understandably led to widespread concern about the increased risk for forest fires," said Dominik Kulakowski, one of the report's authors and a professor of geography and biology at Clark University in Worcester, Mass. "This is a logical concern, but the best available science indicates that the occurrence of large fires in lodgepole pine and spruce-fir forests is mainly influenced by climatic conditions, particularly drought."	(216-11) Ecologically, both lodge pole pine and spruce-fir are very different from ponderosa pine. Please refer to response #216-10.
Artley, Dick	"Reducing burnable biomass, however, does not eliminate wildfires, because fuel reduction does not directly alter the dryness of the biomass or the probability of an ignition."	(216-12) Please refer to response # 216-10. Additionally, pages 28 – 37 in the Fire Ecology/Air Quality report discuss and describe the role of fire in the project area, and the consequences of the interruption of the fire regime over the last century.
Artley, Dick	"Most of the trees that need to be removed to reduce accumulated fuels are small in diameter and have little or no commercial value." "Mechanically removing fuels (through commercial timber harvesting and other means) can also have adverse effects on wildlife habitat and water quality in many areas. Officials told GAO that, because of these effects, a large-scale expansion of commercial timber harvesting alone for removing materials would not be feasible. However, because the Forest Service relies on the timber program for funding many of its activities, including reducing fuels, it has	(216-13) The comment provided was non-specific and general to all "wildlife". The effects to wildlife are disclosed in the DEIS on pages 173-245 and to aquatic species on pages 245-256.; as well as the corresponding specialist reports for wildlife and aquatic species. As an example of the disclosure, we have chosen to have a brief discussion on effects to Mexican spotted owl and goshawk. The biological assessment for the project was submitted to the FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing key habitat components for MSO and

	often used this program to address the wildfire problem. The difficulty with such an approach, however, is that the lands with commercially valuable timber are often not those with the greatest wildfire hazards."	their prey. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project “may affect and is likely to adversely affect MSOs and their habitat, and critical habitat”, (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS found the selected alternative will not jeopardize the continued existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat (USDI FWS 2014, page33). In the wildlife report that has been prepared for the FEIS, the determination of effect for goshawk for the preferred alternative states, “Implementation of alternative C may impact individuals, but is not likely to cause a trend to federal listing or loss of viability” (Wildlife Report, page 473, FEIS, chapter 3).
Artley, Dick	"In April 1999, the General Accounting Office issued a report that raised serious questions about the use of timber sales as a tool of fire management. It noted that "most of the trees that need to be removed to reduce accumulated fuels are small in diameter" -- the very trees that have 'little or no commercial value.' " "As it offers timber for sale to loggers, the Forest Service tends to 'focus on areas with high-value commercial timber rather than on areas with high fire hazards,' the report said. Its sales include 'more large, commercially valuable trees' than are necessary to reduce the so-called accumulated fuels (in other words, the trees that are most likely to burn in a forest fire)." "The truth is that timber sales are causing catastrophic wildfires on national forests, not alleviating them. The Sierra Nevada Ecosystem Project Report, issued in 1996 by the federal government, found that 'timber harvest, through its effects on forest structure, local microclimate and fuel accumulation, has increased fire severity more than any other recent human activity.' The reason goes back to the same conflict that the G.A.O. found: loggers want the big trees, not the little ones that act as fuel in forest fires." "After a 'thinning' timber sale, a forest has far fewer of the large trees, which are naturally fire-resistant because of their	(216-14) Please see our response to #216-7.This is a newspaper article on political views. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

	thick bark; indeed, many of these trees are centuries old and have already survived many fires. Without them, there is less shade. The forest is drier and hotter, making the remaining, smaller trees more susceptible to burning. After logging, forests also have accumulations of flammable debris known as "slash piles" -- unsalable branches and limbs left by logging crews."	
Artley, Dick	"Emerging science demonstrates that the real culprit for creating more wildfires - including southern California's blazes - is not "fuels" but climate and weather. Climate change simply means we must learn to live with more wildfires. Humankind can be pretty smart (we made it to the Moon), but we can also be pretty stupid (we're destroying the lungs of the planet for profit). One thing, however, is certain: Mother Nature knows best. So let's be responsible and stop logging the publicly owned forests, let them recover and let God and nature back in."	(216-15) This is an opinion piece in a newspaper article/ newsletter discussing ongoing fuels reduction in the northwest. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. In the Fire Ecology/ Air Quality report, climate change is discussed on pages 222 – 226.
Artley, Dick	"In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. Correlation coefficients of area logged with rate of spread were > 0.57 for five of the six river basins (table 5). Rate of spread for the Pend Oreille and Wenatchee River basins was strongly associated (r-0.89) with area logged. Correlation of area logged with flame length were > 0.42 for four of six river basins (table 5). The Deschutes and Methow River basins showed the strongest relations. All harvest techniques were associated with increasing rate of spread and flame length, but strength of the associations differed greatly among river basins and harvesting methods." (pg.9) "As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree. Even though these hazards diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon."	(216-16) This is an article on forested landscapes in Oregon and Washington. The fire analysis is based on knowledge of the project area, the best available science and information that apply to those ecosystems, and experience with similar projects in similar vegetation. Methods used for analyzing fire behavior can be found under 'Methodology' on pages 16 - 22 of the Fire Ecology / Air Quality report. Additional information is in Appendix D on pages 283 – 321.Methods used for analyzing emissions can be found under 'Methodology' on page 25 of the Fire Ecology / Air Quality Report. Additional information is in Appendix F on pages329 – 330. Disclosure of effects of the project activates on fire are in the fire ecology section of the DEIS (p149-165). Page 131-132 and page 195 discloses that thinning can indeed increase rates of spread as the article states.
Artley, Dick	"The notion that commercial logging can prevent wildfires has its believers and loud proponents, but this belief does not match up	(216-17) This is an opinion piece in a blog discussing commercial logging. In order for comments to result in improved analysis and

	with the scientific evidence or history of federal management practices. In fact, it is widely recognized that past commercial logging, road-building, livestock grazing and aggressive firefighting are the sources for "forest health" problems such as increased insect infestations, disease outbreaks, and severe wildfires." "How can the sources of these problems also be their solution? This internal contradiction needs more than propaganda to be resolved. It is time for the timber industry and their supporters to heed the facts, not fantasies, and develop forest management policies based on science, not politics."	decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. We recommend reading the vegetation and fire ecology analyses in chapter 3 of the DEIS.
Artley, Dick	"Problems exist with over-generalizing the effects of fire exclusion, and misapplying data derived from short-interval forest ecosystems (e.g. ponderosa pine stands) to long-interval forest ecosystems that have not missed their fire cycles yet and are still within their historic range of variability for stand-replacing fire events (e.g. high elevation lodgepole pine or fir stands)."	(216-18) This is an opinion piece in a blog discussing commercial logging. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Congress should prohibit the use of commercial timber sales and stewardship contracts for hazardous fuels reduction projects. Commercial logging removes the most ecologically valuable, most fire-resistant trees, while leaving behind highly flammable small trees, brush, and logging debris. The use of "goods for services" stewardship contracts also encourages logging larger, more fire-resistant trees in order to make such projects attractive to timber purchasers. The results of such logging are to increase fire risks and fuel hazards, not to reduce them. The financial incentives for abusive logging under the guise of "thinning" must be eliminated."	(216-19) The purpose and need of the 4FRI can be found on pages 8 – 9 of the DEIS, it is restoration, not fuels reduction. Additionally, the claims of the article about removing larger valuable trees is counter to the identified Large Tree Implementation Plan and Old Tree Implementation plans (DEIS, Appendix D) that retain larger and old trees. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Thus, the use of commercial logging for fire hazard reduction poses yet another paradox: Logging removes the trees that normally survive fires, leaves behind the trees that are most often killed by fire, increases flammable fuel loads, and worsens fire weather conditions." (pg. 5)	(216-20) This is a newspaper article on commercial logging and fire. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"In the face of growing public scrutiny and criticism of the agency's logging policies and practices, the Forest Service and their enablers in Congress have learned to mask timber sales as so-called 'fuels reduction' and 'forest restoration' projects. Yet, the net effect of these logging projects is to actually increase fire risks and fuel	(216-21) This is an opinion article in a newspaper (Missoula Independent) on logging and fire. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or

	hazards." "Decades of encouraging private logging companies to take the biggest, oldest, most fire-resistant trees from public lands, while leaving behind a volatile fuel load of small trees, brush, weeds, stumps and slash has vastly increased the flammability of forestlands." "In addition to post-fire salvage logging, the Forest Service and timber industry advocates in Congress have been pushing pre-fire timber sales, often falsely billed as hazardous fuels reduction or 'thinning' projects, to lower the risk or hazard of future wildfires. In too many cases, these so-called thinning projects are logging thick-diameter fire-resistant overstory trees instead of or in addition to cutting thin-sized fire-susceptible understory trees. The resulting logging slash and the increased solar and wind exposure can paradoxically increase the fuel hazards and fire risks."	comments for the Responsible Official to consider.
Artley, Dick	"More than any other recent human activity, the legacy of commercial timber extraction has made public forests more flammable and less resilient to fire. Firstly, clearcut and high-grade logging have historically taken the largest, most fire-resilient, most commercially-valuable trees, and left behind dead needles and limbs (logging debris called "slash"), along with smaller trees and brush that are less commercially valuable but more flammable than mature and old-growth trees. The net effect is to increase the amount of available hazardous fuel." "Secondly, the removal of large overstory trees also changes the microclimate of logged sites, making them hotter, drier, and windier, which increases the intensity and rate of spread of wildfires. Third, the creation of densely-stocked even-aged plantations of young conifers made sites even more flammable since this produced a solid mass of highly combustible conifer needles within easy reach of surface flames. These changes in the fuel load, fuel profile, and microclimate make logged sites more prone to high-intensity and high-severity wildfires."	(216-22) This is a news release from Public Employees for Environmental Responsibility. There is nothing from Ingalsbee that applies to restoration treatments proposed in the 4FRI analysis. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"For example, use of taxpayer dollars and resources on deficit timber sales that remove fire-resilient old-growth trees and leave behind untreated logging slash, violate federal environmental laws in planning or implementation, or are deceptively labeled as "fuels reduction" or "forest restoration" projects when they actually increase fuel hazards or degrade ecological integrity, is an ethical as well as an ecological issue. These kind of anti-ecological, unethical	(216-23) This is from a poster presented at the 3rdInternational Fire Ecology and Management Congress. There is nothing that is applies to the 4FRI analysis. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

Artley, Dick	forest management projects also adversely affect firefighter and community safety by diverting limited federal dollars away from genuine hazardous fuels reduction activities, and by degrading ecological conditions in ways that increase wildfire rate of spread, intensity, or severity." "History, not science, refutes the claim that logging helps to prevent forest fires. The forests of the West are far more vulnerable to fire due to a century of industrial logging and fire suppression. Logging has removed most of the older, fire-resistant trees from the forests. Fire suppression has encouraged many smaller and more flammable trees, brush and dense plantations to fill the holes. Logging has set the forests of the West up to burn big and hot. More logging will not fix this."	(216-24) This is an opinion article in a newspaper (The Register Guard) on logging and fire. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Fear of wildfire is heavily used to sell these forest "restoration" schemes. Logging has not been proven, in practice, to reduce fire frequency or intensity. Historically, the largest, most destructive blazes, like the Tillamook conflagration, were caused from logging or fueled by slash. Unlogged forests, cool and shaded, are typically more fire resistant than cut over, dried-up stands choked with slash and weeds. Large-scale logging (by any name) has devalued our forests, degraded our waters, damaged soils, and endangered a wide variety of plants and animals. How will the current round of politically and environmentally propelled 'restorative' logging proposals differ, in practice, from past logging regimes?"	(216-25) This is an opinion article in a newspaper (The Eugene Weekly) on logging and fire. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"There is a gathering body of evidence that large wildfires are not determined by "unnatural" fuel loading. Lodgepole pine, subalpine fir, and aspen depend on infrequent, stand-replacing, high intensity fires. Most of the B-D NF is well within the natural range of variability. In fact, dense forest stands may not be caused by fire exclusion, but by a series of consecutive wet years that boosted seedling survival and expanded the local range. Drought, wind, and low humidity, not fuels loads, drive large wildifires. Weather and climatic conditions are also the driving force behind expanding insect populations."	(216-26) This article is not relevant to this analysis because it refers to a completely different ecosystem type than southwestern ponderosa pine. See chapter 1 of the DEIS for the relevant existing conditions that defined the need for change.
Artley, Dick	"The Congressional Research Service (CRS) recently addressed the effect of logging on wildfires in an August 2000 report and found that the current wave of forest fires is not related to a decline in timber	(216-27) The link provided was invalid and a search could not find the source of this quote. The 4FRI is using restoration treatments based on soil, stand designation (habitat type, special uses), erosion potential,

	harvest on Federal lands. From a quantitative perspective, the CRS study indicates a very weak relationship between acres logged and the extent and severity of forest fires. To the contrary, in the most recent period (1980 through 1999) the data indicate that fewer acres burned in areas where logging activity was limited." "Qualitative analysis by CRS supports the same conclusion. The CRS stated: "[T]imber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these fine fuels on the forest floor increases the rate of spread of wildfires." Similarly, the National Research Council found that logging and clearcutting can cause rapid regeneration of shrubs and trees that can create highly flammable fuel conditions within a few years of cutting."	etc. 'Commercial logging' is not an objective of the 4FRI. It is designed to return low-severity/high frequency fire to the landscape in intervals that are appropriate for this landscape. Design features that require post treatment fuels to be removed when combined with maintenance burning would reduce the potential for surface fuels to accumulate to the pre-treatment condition , see the Fire Ecology analysis in the DEIS (DEIS, pages 19 – 25; 149 - 165). See 'Chapter 1 – Purpose and Need for Action' in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative. 'Timber harvest' is not an objective of the 4FRI. Treatments were based on site-specific restoration needs, not commercial logging.
Artley, Dick	"I will turn first to forest thinning aimed at reducing fire risks. There is surprisingly little scientific information about how thinning actually affects overall fire risk in national forests." "How can it be that thinning could increase fire risks? First, thinning lets in sunlight and wind, both of which dry out the forest interior and increase flammability. Second, the most flammable material - brush, limbs, twigs, needles, and saplings - is difficult to remove and often left behind. Third, opening up forests promotes brushy, flammable undergrowth. Fourth, logging equipment compacts soil so that water runs off instead of filtering in to keep soils moist and trees healthy. Fifth, thinning introduces diseases and pests, wounds the trees left behind, and generally disrupts natural processes, including some that regulate forest health, all the more so if road construction is involved."	(216-28) The purpose and need of the 4FRI can be found on pages 8 – 9 of the DEIS. Restoration of the historic fire regime is part of the purpose and need as stated on page 9 of the DEIS: "The purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5). The project is expected to move almost 600,000 acres toward comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects." The effects of the proposed actions are disclosed in Chapter 3 of the DEIS and the corresponding specialist reports that are included by reference in the DEIS.
Artley, Dick	"Those who would argue that this form of logging has any positive effects on an ecosystem are clearly misinformed. This type of logging has side effects related to wildfires, first and foremost being that the lumber companies aren't interested in hauling out all the smaller trees, branches, leaves, pine needles, sawdust, and other debris generated by cutting all these trees. All this debris is left on site, quickly dries out, and is far more flammable sitting dead on the	(216-29) This is an article from an online political forum (Democratic Underground) on logging and fire from 2003. There is nothing that applies to the 4FRI analysis. The 4FRI analysis discloses the effects of all proposed restoration activities (including thinning of trees) in Chapter 3 of the DEIS and the corresponding specialist reports. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a

Artley, Dick	ground than it was living in the trees. Smaller, non-commercially viable trees are left behind (dead) as well - creating even more highly flammable fuel on the ground. "Almost seven times more forested federal land burned during the 1987-2003 period than during the prior 17 years. In addition, large fires occurred about four times more often during the latter period." "The increases in fire extent and frequency are strongly linked to higher March-through-August temperatures and are most pronounced for mid-elevation forests in the northern Rocky Mountains. The new finding points to climate change, not fire suppression policies and forest fuel accumulation, as the primary driver of recent increases in large forest fires."	direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. (216-30) The 4FRI analysis is concerned with restoring the forest conditions that support a fire regime of high frequency/low severity fire in southwestern ponderosa pine (in the Fire Ecology/ Air Quality report see pages 28 – 37; in the DEIS, see pages 9 – 20 (vegetation/wildlife existing condition), 21 – 24 (fire existing condition), 122 – 124 (vegetation – affected environment), 149 – 154 (fire affected environment).
Artley, Dick	"We inferred climate drivers of 20th-century years with regionally synchronous forest fires in the U.S. northern Rockies. We derived annual fire extent from an existing fire atlas that includes 5038 fire polygons recorded from 12070086 ha, or 71% of the forested land in Idaho and Montana west of the Continental Divide. The 11 regional-fire years, those exceeding the 90th percentile in annual fire extent from 1900 to 2003 (>102314 ha or ~1% of the fire atlas recording area), were concentrated early and late in the century (six from 1900 to 1934 and five from 1988 to 2003). During both periods, regional-fire years were ones when warm springs were followed by warm, dry summers and also when the Pacific Decadal Oscillation (PDO) was positive. Spring snowpack was likely reduced during warm springs and when PDO was positive, resulting in longer fire seasons. Regional-fire years did not vary with El Nino-Southern Oscillation (ENSO) or with climate in antecedent years. The long mid-20th century period lacking regional-fire years (1935-1987) had generally cool springs, generally negative PDO, and a lack of extremely dry summers; also, this was a period of active fire suppression. The climate drivers of regionally synchronous fire that we inferred are congruent with those of previous centuries in this region, suggesting a strong influence of spring and summer climate on fire activity throughout the 20th century despite major land-use change and fire suppression efforts. The relatively cool, moist climate during the mid-century gap in regional-fire years likely contributed to the success of fire suppression during that period. In every regional-fire year, fires	(216-31) This was an invalid link, but we were able to find it using Google Scholar. This paper is not relevant to the 4FRI because it discusses an analysis done in Idaho and Montana, and area where large scale climate shifts and patterns are very different from the southwest. However, the 4FRI DEIS does discuss climate change on pages 321-329. Also, climate change in relation to fire is discussed in detail in the fire ecology specialist report on p 222-226. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

	burned across a range of vegetation types. Given our results and the projections for warmer springs and continued warm, dry summers, forests of the U.S. northern Rockies are likely to experience synchronous, large fires in the future."	
Artley, Dick	"Still, forestry experts warned in the 2000 plan that logging should be used carefully and rarely; in fact, the original draft states plainly that the "removal of large merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk." "Now, critics charge that the Bush administration is ignoring that warning. Neil Lawrence, a policy analyst with the Natural Resource Defense Council, claims that Washington has taken a far more aggressive approach to incorporating commercial logging in its wildfire prevention plans. As a result, Lawrence and other critics say, the National Fire Plan is becoming a feeding ground for logging companies. Moreover, critics claim the administration's strategy, far from protecting the lives and homes of those most at risk, could actually increase the likelihood of wildfires."	(216-32) This piece is largely an opinion piece, with no information that applies to the 4FRI analysis. The 4FRI analysis discloses the effects of all proposed restoration activities (including thinning of trees) in Chapter 3 of the DEIS and the corresponding specialist reports. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Fuel reduction treatments should be forgone if forest ecosystems are to provide maximal amelioration of atmospheric carbon dioxide over the next 100 years,' the study authors wrote in their conclusion. 'If fuel reduction treatments are effective in reducing fire severities in the western hemlock, Douglas-fir forests of the west Cascades and the western hemlock, Sitka spruce forests of the Coast Range, it will come at the cost of long-term carbon storage, even if harvested materials are used as biofuels.' "	(216-33) The paper discusses ecosystems in the northwest that do not occur in Arizona (Sitka spruce, western hemlock, etc.), and for which the carbon dynamics would be very different from a dry ponderosa pine system. In the DEIS, climate change is referenced throughout the document. Details on Climate Change are discusses on pages 321 – 329. In the Fire Ecology/ Air Quality report, climate change is discussed on pages 222 – 226.
Artley, Dick	"While top officials blame recent fires on fuels, all the on-the-ground reports I've read focus on the weather."	(216-34) This piece is largely an opinion piece, from a website for the Thoreau Institute with no information that applies to the 4FRI analysis. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"This paper will show that built-up fuels are not the main reason, or even a major reason, for recent severe fires or high fire suppression costs. The weather is the prime reason for widespread fires this year as well as in 2000, 1999, and other recent years. But the major reason for increased costs is institutional: The federal land agencies,	Please see the response to #216-34.

	and especially the Forest Service, have a blank check to put out fires and thus have no reason to control their costs. If fuels are not the problem, then it isn't necessary to spend $400 million a year treating them."	
Artley, Dick	"Post-fire reports on individual fires make little or no mention of excess fuels. Instead, fire scientists agree that drought is the cause of the severe fires in recent years. This year's Rodeo- Chedisky Fire, the largest fire in Arizona history, was on heavily managed and thinned federal lands, not an untouched wilderness brimming with excess fuels."	In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"The current focus on 'fuels' is, in itself, misguided because almost anything in a forest will burn, given the right conditions. Any fire specialist will tell you that the principal factors affecting fire are temperature and moisture, not fuels. No legislation will prevent or even reduce fires in the vast areas of the national forests and to pretend so is fraudulent."	While the link given does, in fact, take one to a Univision website, there was no link that appeared to apply to anything relating to fire, fuels, forests, or the USFS. There was insufficient information available to evaluate this comment.
Artley, Dick	"A number of studies have shown that for some ecosystems, the major factor determining fire intensity and size is weather and not the amount of fuel (Baker 1989, Flannigan and Harrington 1988, Haines and Sando 1969, Rothermel 1995). For example, Bessie and Johnson (1995) found that fire spread and intensity were strongly related to weather conditions and only weakly related to fuel loads in the southern Canadian Rockies. Similarly, many hundreds of the thousands of acres of forests that were intensely burned in the 1994 Tyee Fire on the Wenatchee National Forest had very low fuel loads. The Forest Service and Fish and Wildlife Service concluded that weather patterns and terrain -- not fuels -- were the major reasons why this large fire burned the way it did (U.S. Forest Service 1995, U.S. Fish & Wildlife Service 1994). Such case studies provide little evidence that salvage logging of dead and dying trees will significantly reduce wildfires."	The link does not work, but a search turned up two options. Both required the purchase of the book; therefore, there was insufficient information available to evaluate this comment. With that being said, the comment discusses the pacific northwest and salvage logging---both of which are absent from the 4FRI analysis.
Artley, Dick	"H.R 1904 does not include any specific measures to protect homes or communities. It is also inconsistent with the Western Governors' Association 10-Year Comprehensive Strategy, which does not call for any changes in existing laws. The only proven method to protect homes and communities is to reduce flammable materials in the immediate vicinity of structures, yet the definitions in H.R. 1904	The link does not work. There was insufficient information available to evaluate this comment. In any case, the 4FRI is not a HFRA project.

Artley, Dick	would not require any activities to be near homes. Instead, the bill seeks to further subsidize the timber industry and eliminate obstacles to logging large, fire-resistant trees miles away from the nearest home. The country's top forest scientists, including the Forest Service's own scientists, have found that this kind of logging can actually increase fire risk and make fires larger and more intense." "We question the validity of thinning as a means both to reduce the threat of wildfire and to restore historic forest structure in the absence of site-specific data collection on past and present landscape conditions."	Please see the response to #216-28.
Artley, Dick	"We inferred climate drivers of 20th-century years with regionally synchronous forest fires in the U.S. northern Rockies. We derived annual fire extent from an existing fire atlas that includes 5038 fire polygons recorded from 12070086 ha, or 71% of the forested land in Idaho and Montana west of the Continental Divide. The 11 regional-fire years, those exceeding the 90th percentile in annual fire extent from 1900 to 2003 (>102314 ha or ~1% of the fire atlas recording area), were concentrated early and late in the century (six from 1900 to 1934 and five from 1988 to 2003). During both periods, regional-fire years were ones when warm springs were followed by warm, dry summers and also when the Pacific Decadal Oscillation (PDO) was positive. Spring snowpack was likely reduced during warm springs and when PDO was positive, resulting in longer fire seasons. Regional-fire years did not vary with El Nino-Southern Oscillation (ENSO) or with climate in antecedent years. The long mid-20th century period lacking regional-fire years (1935-1987) had generally cool springs, generally negative PDO, and a lack of extremely dry summers; also, this was a period of active fire suppression. The climate drivers of regionally synchronous fire that we inferred are congruent with those of previous centuries in this region, suggesting a strong influence of spring and summer climate on fire activity throughout the 20th century despite major land-use change and fire suppression efforts. The relatively cool, moist climate during the mid-century gap in regional-fire years likely contributed to the success of fire suppression during that period. In every regional-fire year, fires burned across a range of vegetation types. Given our results and the projections for warmer springs and continued warm, dry summers, forests of the U.S. northern Rockies are likely to experience synchronous, large fires in the future."	
Artley, Dick	"While most of us have suffered with the unavoidable fire-related anxieties, we have also been impressed by the hard work and heroism of both neighbors and anonymous firefighters. But others have tried to profit from the fires and the primordial fears they evoke. The forest products industry has been in the lead in this exploitation of other people's hardtimes. The forest products industry wants access as cheaply as it can get it to as much wood fiber as possible. It once had privileged access to forested public lands. As the frontier economy has faded and government give-aways have fallen out of political favor, the forest products industry's privileged grip on public resources has begun to slip. The current forest fires offer them an opportunity to try to regain some of their	This piece is an opinion piece, from a website for The Wolf Recovery Program with no information that applies to the 4FRI analysis. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

Artley, Dick	lost clout. The fires, timber industry spokespersons claim, are the result of restrictions on commercial logging on public lands. If all of these lands had been logged, they assert, the fires would not be burning. It is the federal government and the environmentalists they are in cahoots with who have caused the fires that now threaten us. As one timber industry advocate baldly said, "I never saw a clearcut burn." Nothing could be further from the truth. Of course clearcuts burn. When long, hot summers dry out the grasses, brush, and logging wastes, they can flare explosively. When they grow thick with closely packed young trees, they present exactly the fire danger we are wrestling with now. The logging roads provide human access that is the source of the vast majority of forest fires. If roading and logging eliminated the threat of wildfire, most of the fires that threaten us now would not be burning. Look at where these fires are: They are largely burning on the forest-urban interface in areas adjacent to intense human activity. In Western Montana, for instance, the fires are in are burning in the forests adjacent to some of the rapidly growing residential areas in the nation, the Bitterroot, Helena, and Clark Fork Valleys. These are not roadless areas that have never been logged. Quite the contrary, they are areas that were roaded and logged in the past. Those roads often have then provided access for the human activity that now dominates these areas, including the home building, residential settlement of the last two decades, and recreational activity. The trees now burning are usually second growth that followed past logging." "It is well established that logging and roadbuilding often increase both fuel loading and fire risk. For example, the Sierra Nevada Ecosystem Project (SNEP) Science Team (1996) concluded that "timber harvest…. has increased fire severity more than any other recent human activity" in the Sierra Nevada. Timber harvest may increase fire hazard by drying of microclimate associated with canopy opening and with roads, by increases in fuel loading by generation of activity fuels, by increases in ignition sources associated with machinery and roads, by changes in species composition due to opening of stands, by the spread of highly flammable non native weeds, insects and disease, and by decreases in forest health associated with damage to soil and residual trees	Please see response to #216-28.

	(DellaSala and Frost, 2001; Graham et al., 2001; Weatherspoon et al., 1992; SNEP Science Team, 1996). Indeed a recent literature review reported that some studies have found a positive correlation between the occurrence of past logging and present fire hazard in some forest types in the Interior Columbia Basin (DellaSala and Frost, 2001)."	
Artley, Dick	"No evidence suggests that spruce-fir or lodgepole pine forests have experienced substantial shifts in stand structure over recent decades as a result of fire suppression. Overall, variation in climate rather than in fuels appears to exert the largest influence on the size, timing, and severity of fires in subalpine forests (Romme and Despain 1989, Bessie and Johnson 1995, Nash and Johnson 1996, Rollins et al. 2002). We conclude that large, infrequent standreplacing fires are "business as usual" in this forest type, not an artifact of fire suppression." (Pg. 666) "Variation in daily area burned was highly correlated with the moisture content of 100-hour (2.5- to 7.6- cm diameter) and 1000-hour dead fuels (Turner et al. 1994). Once fuels reached critical moisture levels later in the season, the spatial pattern of the large, severe standreplacing fires was controlled by weather (wind direction and velocity), not by fuels, stand age, or firefighting activities (Minshall et al. 1989,Wakimoto 1989, Turner et al. 1994)." (Pg. 666)	Link is broken, but a search found the citation. The article clearly indicates the discussion is about spruce/fir or lodge pole pine forests and does not apply to the 4FRI.In order for comments to result in improved analysis and decisions; they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Fire, just like insects and disease, are a natural and beneficial part of forest ecosystems and watersheds. Without these natural processes the forest ecosystems quickly degrade. Excessive logging removes and reduces cooling shade adding to the hotter, drier forests along with logging debris creating a more flammable forest. Current "forest management" practices, road building and development cause forest fires to rage for hundreds of miles."	This is an opinion piece from Common Dreams in 2003.In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Commercial logging and logging roads open the forest canopy, which can have two effects. First, it allows direct sunlight to reach the forest floor, leading to increased evaporation and drier forests.5 As a consequence, ground fuels (grass, leaves, needles, twigs, etc.) dry out more quickly and become susceptible to fire. Second, an open canopy allows more sunlight to reach the understory trees, increasing their growth.6 This can lead to weaker, more densely-packed forests." (pgs. 19-20) "Congress and the Forest Service	Link is broken, but a search and a couple of websites located the paper. The 4FRI is using restoration treatments based on soil, stand designation (habitat type, special uses), erosion potential, etc. to begin the restore the historic structure, pattern and composition of southwestern ponderosa pine. 'Commercial logging' is not an objective of the 4FRI. The 4FRI DEIS discloses the effects of proposed actions within Chapter 3 of the document, as well as within the corresponding specialist reports that are included by reference. In order for comments

	continue to rely on the commercial logging program to do something it will never accomplish - reduce fire risk. The commercial logging program is designed to provide trees to private timber companies, not to reduce the risk of fire." (pg. 20)	to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Indiscriminate logging is not a viable solution to reducing wildfire risk. Logging can actually increase fire danger by leaving flammable debris on the forest floor. Loss of tree canopy lets the sun in, encouraging the growth of brush, increases wind speed and air temperature, and decreases the humidity in the forest, making fire conditions even worse."	This article is from a newspaper (The Sacramento Bee), and does not contain any information that applies to the 4FRI. The 4FRI is using restoration treatments based on soil, stand designation (habitat type, special uses), erosion potential, etc. to begin to move towards the desired structure, pattern and composition of southwestern ponderosa pine. 'Commercial logging' is not an objective of the 4FRI.
Artley, Dick	"Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity."(pg.62)	The link does not work. There was insufficient information available to evaluate this comment.
Artley, Dick	"Why is the natural fire regime in most Rocky Mountain ponderosa pine-Douglas fir forests variable in severity? Extended droughts and high winds can lead to exceptional fire spread across a broad spectrum of fuel loads and forest structures. For example, almost 25,000 ha of ponderosa pine- Douglas fir forest burned on a single day (9 June 2002), driven by strong winds (Finney et al., 2003). Yet, brief episodes when the winds declined and fuel moisture rose, led to low-severity fire in the same landscape (Finney et al., 2003), suggesting that extreme weather, not fuels, was the chief cause of high-severity fire under those conditions. Even during summer, ponderosa pine-Douglas fir landscapes in the Rocky Mountains are subject to rapid increases in wind speed and changes in direction from jet streams or cold fronts (Baker, 2003)." (pg. 5)	This citation is from a 273 page Environmental Assessment on the Wallowa-Whitman NF in the Pacific NW. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Ironically, this very type of logging, experts inform us, is likely to increase, not decrease, the frequency and severity of wildland fires. In the Forest Service's own National Fire Plan, agency scientists warned against the use of commercial logging to address fire management. The report found that 'the removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk.' "	This is a newspaper article from The Baltimore Chronicle. There is no information here that applies to the 4FRI analysis. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"The federal assistance could include funding to help state and local governments mitigate the beetle infestations, the presence of which increases the risk of forest wildfires that endanger surrounding communities and infrastructure, said supporters of the bill."	Please the response to #216-10.

Artley, Dick	"Kulakowski, a former research scientist at the University of Colorado at Boulder and current professor at Clark University in Massachusetts, discounted this notion during his testimony. He said climate, not insects, plays the most important role in forest fires, as wildfires are more likely to occur during droughts." "New research published this week in the journal Science says that global warming may be causing more intense wildfires in the western United States. The researchers found that increases in large wildfire activity in the western United States over the past 25 years is 'strongly associated with increased spring and summer temperatures and an earlier spring snowmelt.' "	See response to #216-30.In the DEIS, climate change is referenced throughout the document. Details on Climate Change are discusses on pages 321 – 329 and in the Fire Ecology/ Air Quality report, climate change is discussed on pages 222 – 226.
Artley, Dick	"Indeed, climatic conditions drive all big fires - not fuels. All substantial fires occur only if there is extended drought, low humidity, high temperatures and, most importantly, high winds. Wind, in particular, is critical. Wind increases fire spread exponentially. When conditions are "ripe" for a large blaze, fires will burn through all kinds of fuel loads. By contrast if the forest is wet like Oregon's coastal forests, you can have all the fuel in the world, and it won't burn. For this reason, most fires go out without burning more than a few acres. By contrast, when you have drought, low humidity, high temperatures and wind, a few blazes will grow into huge fires. For this reason, approximately 1 percent of all fires are responsible for about 95 to 99 percent of the acreage burned."	Please see response to #216-52.
Artley, Dick	"Another surprising finding is that mechanical fuels treatment, commonly known as logging and thinning, typically has little effect on the spread of wildfires. In fact, in some cases, it can increase wildfires' spread and severity by increasing the fine fuels on the ground (slash) and by opening the forest to greater wind and solar penetration, drying fuels faster than in unlogged forests."	This is an opinion piece on a blog discussion about the causes of severe wildfires. The purpose and need of the 4FRI can be found on pages 8 – 9 of the DEIS, and it is not mechanical fuel treatment. The fire ecology portion of Chapter 3 of the DEIS and the fire ecology specialist report discuss how fire behavior is changed by proposed restoration treatments.
Artley, Dick	"For example, the Forest Service justifies the Elliston Face timber sale on the basis of reducing what they call "hazardous" fuels (which as an ecologist I call woody biomass). To quote the FS, "This project would reduce wildland fire risk and help protect lives, communities, and ecosystems from the potential consequences of a high-intensity wildland fire within treatment areas." " "The Forest Service makes these assertions even though the statement is full of falsehoods, misleading and/or unproven assumptions." "even the Forest	This is an opinion piece on a blog discussion about the causes of severe wildfires, mostly in Montana. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

	Service's own analysis concludes that logging of the Elliston Face will have some adverse impacts on soils, watersheds, wildlife, scenery and recreation. So we need to ask whether the potential effects of a fire that may not occur for a century or more is worth the negative impacts created by the logging process now?" "The Forest Service's own analysis has six indicator species- including pileated woodpecker, hairy woodpecker, martin, northern goshawk. These species depend on dead snags and down wood that pine beetles and wildfire create. But the FS treats beetles and wildfire as unwelcome events." "the FS exploits the fears of misinformed citizens. One can only conclude the agency is still the handmaiden to the timber industry rather than a public servant working on behalf of all citizens of the country."	
Artley, Dick	"Ultimately, fuels do not control fires. If the climate/weather isn't conducive for fire spread, it doesn't much matter how much dead wood you have piled up, you won't get a large fire. As an extreme example, think of all the dead wood lying around on the ground in old-growth West Coast rainforests - tons of fuel, but few fires - because it's too wet to burn. Large blazes are driven by a combination of extreme drought, low humidity, high temperatures and, most importantly, wind. These conditions do not occur in the same place at the same time very frequently - which is why there are often decades to centuries between major blazes and most fires go out without burning more than a few acres."	This is an opinion piece in a newspaper (the Independent Record). There is nothing in the piece that applies to the 4FRI analysis area and the actions proposed within the DEIS.
Artley, Dick	Why the National Fire Plan is a Trojan Horse for Logging Burning Questions	This is an opinion piece from a blog discussing the effectiveness of fuels treatments at stopping wildfire in the Northern Rockies--a very different ecosystem from the 4FRI landscape. In addition, the article is about fuels reduction (which 4FRI is not), and not landscape scale restoration (which 4FRI is-see DEIS purpose and need in Chapter 1), which are very different proposals (see response to comment 8-27 and response 213).In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Fragmentation has been considered as one of the most major factors that lead to the decline of many wildlife species (Brittingham	(217-1) This is an unpublished paper that discusses the effects of habitat fragmentation due to clearcuts. The 4FRI project does not have

	and Temple 1983, Yahner 1988, Winslow et al. 2000) because fragmentation tends to decrease population productivity (Robinson et al. 1995). Therefore, Meffe states that "fragmentation has become a major subject of research and debate in conservation biology" (Meffe et al. 1997, p. 272). Forest fragmentation usually occurs when large and continuous forests are divided into smaller patches as a result of road establishment, clearing for agriculture, and human development (Robinson et al. 1995, Meffe et al. 1997)." (Pg. 1) "Generally, habitat fragmentation is an ecological process in which a large patch of habitat is divided into smaller patches of habitats. Usually, this process is caused by human activities (roads, agriculture, and logging). It also reduces the value of the landscape as habitat for many species (plants and animals). Fragmentation alters natural habitat in many ways, including reduction of patches' sizes, increment of distances between similar patches, and increment of edges and predation (Brittingham and Temple 1983, Robinson et al. 1995)." (Pp. 2 and 3)	any prescription that proposes clearcuts. The DEIS discusses habitat connectivity for wildlife species on page 174 and on page 40 of the wildlife specialist report. The complete analysis for bridge habitat for canopy-dependent wildlife can be found in appendix G of the DEIS and appendix 3 of the wildlife report. The terrestrial wildlife specialist report discloses habitat fragmentation for wildlife species in several areas: page 120 for four spotted skippling; page 144, 585 and 592 for pronghorn; page 176 discusses climate change and habitat fragmentation; page 194 for the Mexican spotted owl; page 375 for nitocris fritillary; page 380 for Navajo Mogollon vole; page 385 for long-tailed vole; page 386 for the dwarf shrew; page 388 for the Merriam's shrew; page 521-523, 634, and 674 for effects to understory species. Habitat effects could be similar to those that would occur with severe wildfire and could ultimately lead to habitat fragmentation or vegetation type conversions (Chapter 1 DEIS). The effects of roads to wildlife is discussed in the DEIS on pages 185-186, 202, 204, 205, 208 – 210, and 219-221.
Artley, Dick	"Debris slides over a 20-year period were inventoried on 137,500 acres of forested land in the Klamath Mountains of southwest Oregon. Frequency during the study period was about one slide every 4.3 years on each 1,000 acres-an erosion rate of about 1/2 yd3 per acre per year. Erosion rates on roads and landings were 100 times those on undisturbed areas, while erosion on harvested areas was seven times that of undisturbed areas. Three-quarters of the slides were found on slopes steeper than 70 percent and half were on the lower third of slopes." "Soil erosion rates due to debris slides were many times higher on forests with roads, landings, and logging activity than on undisturbed forests."	(217-2) This is a report from logging operations on the Klamath National Forest in SW Oregon. SW Oregon environments have different environmental and climatic conditions (much more precipitation), than the dryer Ponderosa Pine dominated forests in the 4FRI project area and have higher risk of debris slides and higher erosion rates. In addition, the article states three-quarters of the slides were found on slopes steeper than 70%. 4FRI does not propose any ground disturbance treatments or roads construction on slopes greater than 40% and consequently, have very low risk of debris slides and associated erosion than on the Klamath. The effects disclosed in chapter 3 of the DEIS are site-specific to this project. The potential for soil disturbance and soil erosion is disclosed in the DEIS on page 109 to page 113 (affected environment), and on page 113 to page 118 (environmental consequences) and pages 118-126 (Water) and in the soil specialist report from page 60 to page 120. Additionally, design features, mitigation measures and the following Soil and Water BMP's located in Appendix C, page 567 of DEIS have been developed and will be implemented (for timber harvest operations) to maintain and protect soil productivity, minimize sediment delivery and improve and protect water quality.

		The link provided was invalid, but the citation was found. The article provides a general description of ecological consideration that should be incorporated into sound forest management practices. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	" 'Roads may have unavoidable effects on streams, no matter how well they are located, designed or maintained. The sediment contribution to streams from roads is often much greater than that from all other land management activities combined, including log skidding and yarding.' (Gibbons and Salo 1973). Research by Megahan and Kidd in 1972 found that roads built in areas with highly erosive soils can contribute up to 220 times as much sediment to streams as intact forests."	
Artley, Dick	"Plot-level studies have demonstrated the ability of forest roads to intercept and route both subsurface and surface overland flow more efficiently to the stream network. Significant amount of subsurface throughflow can be intercepted by the road, as a function of the road cut depth and the current saturation deficit, and then redirected, concentrating the flow in particular areas below the road. Road drainage concentration increases the effective length of the channel network and strongly influences the distribution of erosional processes. The concept of wetness index has been used in the study as a surrogate for subsurface throughflow, and the effect of forest roads on subsurface throghflow rerouting has been assessed by evaluating the changes in terms of draining upslope areas. A threshold model for shallow slope instability has been used to analyse erosional impacts of drainage modifications. In the model, the occurrence of shallow landsliding is evaluated in terms of drainage areas, ground slope and soil properties (i.e., hydraulic conductivity, bulk density, and friction angle). The model has been used to generate hypotheses about the broader geomorphic effect of roads. Modelling results have been compared with available field data collected in north-eastern Italy."	The referenced citation is merely an abstract. The abstract is only broadly relevant to roads within the project area as the publication is based on roads located in Italy. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"A large scale land use experiment has taken place over the last 40	The link provided was invalid (i.e., returned no results). The first

	years in the mountainous areas of the northwestern U.S. through timber harvesting. This land use change effects the hydrology of an area through two mechanisms: * Clear-cut logging which causes changes in the dynamics of Rain-On-Snow (ROS) events due to changes in the accumulation and ablation of snow caused by vegetation effects on snow interception and melt; and * Construction and maintenance of forest roads which channel intercepted subsurface flow and infiltration excess runoff to the stream network more quickly."	comment is related to clearcutting, which is irrelevant to this project. The second comment is related to the effects of roads in the northwest U.S. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Many of the conclusions and assumptions contained in the Roads Report are based on analysis of the positive contributions of roads. Negative socio-economic effects of roads have been, in large part, glossed over. The general view expressed in the Roads Report is that overall, roads make a positive socio-economic contribution." "The Socio-Economic Effects section has been constructed to overwhelmingly support the contention that the benefits of roads outweigh the costs. In order to arrive at such a conclusion, however, certain important economic costs and concepts have been omitted." "A serious problem with the Roads Report is its lack of discussion concerning the economic costs arising from the negative ecological effects of roads. Despite overwhelming scientific data linking roads and sedimentation (Bennett 1991; Grayson et al. 1993; Lyon 1984; Megahan 1980; McCashion and Rice 1983; Wade 1998; Williams 1998), the socio-economic costs of mitigating the effects of this sedimentation receive no mention in the Roads Report. Such costs are central to and should be included in any socio-economic assessment of forest roads."	The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current road through decommission of 904 miles of road (DEIS at p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The transportation specialist report ties to the negative effects of roads stated within soil and water respective specialists reports (transportation specialist report, p 14). As a point of clarification, the units of measure for the transportation specialist report (analysis is not socio-economic, but is as follows: "The analysis will focus on two items related to the purpose and need of the project. First, the analysis will disclose how the needed access to the analysis area by alternative in order to implement the proposed action. The unit of measure will be miles of system road and miles of temporary road. Second, the analysis will disclose how each alternative moves towards a safe and more affordable transportation system that is identified within each Forests respective TAP documents. The unit of measure will be miles of decommissioned roads and miles of open road for a more affordable road system, and the miles of road maintenance for road safety. The timeframe for the analysis will be the life of the project (about10-15 years)." (p 13 transportation specialist report). The affordable transportation system ties to the direction outlined in Travel

		Management (36 CFR Part 212, Subparts A) that refers to a minimum road system. The guidance is displayed in the transportation specialist report at page 4. The citations listed within the comment are not complete, and cannot with certainty be tied to articles found through web searches. However, the articles that were located are consistent with sedimentation effects discussed in Grayson et al 1993 and McCashion and Rice 1983. An abstract for the Bennett 1991 article was found, and there are not specific references to sedimentation, however the abstract does state that roads are a source of biotic and abiotic effects on the surrounding landscape-which is consistent with negative effects of sedimentation. The Lyon 1984 article refers to elk habitat modeling and has no application to the socio-economic effect of roads. There are not complete citations for the Wade 1998, and Williams 1998 and these could not be found. The transportation specialist report for the FEIS will be more explicit that Alternative A will continue with the deleterious effects of roads that you have pointed out and that the action alternatives will actually decrease these effects.
	"The present road system constitutes a legacy of current and potential sources of damage to aquatic and riparian habitats, mostly through sedimentation, and to terrestrial habitats through fragmentation and increased access" (Amaranthus et all 1985)." "The failure of the Report to properly address mitigation costs associated with the ecological effects is a serious problem that needs to be addressed in future drafts. Similarly, passive-use values need to be taken seriously and considered throughout the Roads Report. In order to rectify these problems, most of the Socio-Economic Effects subsections will have to be reworked. Failing to do so, the Roads Report will paint an incomplete picture of the costs and benefits	The article provides a review of the Forest Service roads policy titled: Forest Service Roads: a Synthesis of Scientific Information (1998). The article is a position statement that identifies proposed weaknesses in the analysis and policy. For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	associated with the Forest Service's road program."	
	"Sediment input to freshwater is due to either the slower, large-scale	
Artley, Dick	process of soil erosion, or to rapid, localized "mass movements,"	The reference cited is specific to salvage logging following mountain pine beetle infestations. The 4FRI project does not include salvage

	such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991)." "Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981)." "More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads." "In areas made highly turbid (cloudy) from sedimentation, the foraging ability of adults and juveniles may be inhibited through decreased algal production and subsequent declines in insect abundance, or, for visual-feeding taxa dependent on good light, through their inability to find and capture food. Highly silted water may damage gill tissue and cause mortality or physiological stress of adults and juveniles."	logging. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"The road construction and right-of-way logging were immediately detrimental to most aquatic invertebrates in South Fork Caspar Creek" "Salmonid populations decreased immediately after the road construction." "Sustained logging and associated road construction over a period of many years do not afford either the stream or the 'fish population a chance to recover."	This 1972 article addresses the effects of road construction and logging on anadromous fish production on the Pacific Coast of CA. There are no anadromous fish within the 4FRI analysis area and therefore this comment is irrelevant to the project. But the environmental effects of each action alternative to water quantity, water quality and riparian areas are disclosed in Table 31, pages 102 and 103 of the DEIS and in the Water Quality and Riparian Area Specialist's Report, Table 6, page 39. The effects of roads on aquatic species can be found in the DEIS at p 249, p 251-255) and BMP's to minimize impacts from roads are located at page 583-585 (BMP's SW10-SW20) and within the fisheries specialists report at multiple locations, including BMP's @ p 32-34, affects (p 60, p 64-65, p 66 and the final species effects (that includes the effects of roads and all other activities proposed within the analysis area) are included in pages 82-107.
Artley, Dick	"Forest roads apparently can serve as a partial filter to the movements of some amphibian species"	The effects of roads on aquatic species can be found in the DEIS at p 249, p 251-255. BMPs to minimize impacts from roads are located at page 583-585 (BMPs SW10-SW20), and within the fisheries specialists report at multiple locations, including BMPs at p 32-34, effects p 60, p 64-66, and the final species effects (that includes the effects of roads and all other activities proposed within the analysis area) are included in pages 82-107. The DEIS on page 201 discuss the effects to northern

		leopard frog. The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The publication discusses and discloses the adverse ecological effects of forest roads, which are not refuted. The citation concludes with a statement of support for a road management strategy on NFS lands that would improve service to users, protect environmental values, enhance public safety, mitigate environmental impacts, promote viable local communities, and boost credibility of our natural resource management. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. The emphasis of this web page reference is forest fragmentation caused by roads. However other adverse effects of forest roads are discussed. These potential adverse effects are not refuted. For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88),
Artley, Dick	"Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road."	
Artley, Dick	"Few marks on the land are more lasting than roads." "The negative effects on the landscape of constructing new roads, deferring maintenance, and decommissioning old roads are well documented. Unwanted or non-native plant species can be transported on vehicles and clothing by users of roads, ultimately displacing native species. Roads may fragment and degrade habitat for wildlife species and eliminate travel corridors of other species. Poorly designed or maintained roads promote erosion and landslides, degrading riparian and wetland habitat through sedimentation and changes in streamflow and water temperature, with associated reductions in fish habitat and productivity. Also, roads allow people to travel into previously difficult or impossible to access areas, resulting in indirect impacts such as ground and habitat disturbance, increased pressure on wildlife species, increased litter, sanitation needs and vandalism, and increased frequency of human-caused fires."	
Artley, Dick	"Fragmentation caused by roads is of special interest because the effects of roads extend tens to hundreds of yards from the roads themselves, altering habitats and water drainage patterns, disrupting wildlife movement, introducing exotic plant species, and increasing noise levels. The land development that follows roads out into rural areas usually leads to more roads, an expansion process that only ends at natural or legislated barriers."	

Artley, Dick	"A huge road network with vehicles ramifies across the land, representing a surprising frontier of ecology. Species-rich roadsides are conduits for few species. Roadkills are a premier mortality source, yet except for local spots, rates rarely limit population size. Road avoidance, especially due to traffic noise, has a greater ecological impact. The still-more-important barrier effect subdivides populations, with demographic and probably genetic consequences. Road networks crossing landscapes cause local hydrologic and erosion effects, whereas stream networks and distant valleys receive major peak-flow and sediment impacts. Chemical effects mainly occur near roads. Road networks interrupt horizontal ecological flows, alter landscape spatial pattern, and therefore inhibit important interior species. Thus, road density and network structure are informative landscape ecology assays. Australia has huge road-reserve networks of native vegetation, whereas the Dutch have tunnels and overpasses perforating road barriers to enhance ecological flows. Based on road-effect zones, an estimated 15-20% of the United States is ecologically impacted by roads."	The publication provides a global-scale review of the ecological effects of road corridors. It does not address road construction. The article primarily concentrates on major, arterial roads and not unpaved forest roads. For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Questions to consider: Roads dramatically alter forest ecosystems 1. Does the management prescription account for the ecological effects of the road construction and maintenance activities associated with carrying out such activities? 2. Have alternatives to road building been considered? How does the plan attempt to address the effects of roads?" (page 37)	Thank you for the informative article from Franklin et al. The hyperlink to the article did not work but a search found the original article. A majority of the article concerns old growth and wildlife habitat, but the section on the effects of roads is: "The success of watershed and aquatic restoration programs in forested landscapes will depend upon a series of measures related to roads, including improved maintenance and reconstruction of permanent road, obliteration of unnecessary road and avoidance of road construction in watersheds that are currently road-free…. "(Franklin et al, p30) is germane, with the exception of the building of new roads in watersheds that are road free. We agree with this statement wholeheartedly. The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a

reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), the relocation of up to 10 miles of road (DEIS @ page 41 p 63, Table 18 p 74, p 81, p 88), and maintenance of nearly 2,300 miles of roads necessary for haul (DEIS p 319) thus actually decreasing the effects of roads that are currently located within the analysis area. Specifically, the Franklin et al article asks the following questions on page 37 of the document: Does the management prescription account for the ecological effects of the road construction and maintenance activities associated with carrying out such activities? Yes, the Forest Service has disclosed the effects of ecological effects of roads in various sections of the DEIS, with the following sections highlighted because they are highlighted items in the article-water quality, aquatic species, wildlife and noxious weed dispersal. Please see response #8-4/4 for the specific response concerning the effects on water quality, aquatic species, wildlife, and noxious weed dispersal. The next question the article poses in relation to roads and management are as follows: Have alternatives to road building been considered? How does the plan attempt to address the effects of roads? Does the plan call for obliteration and revegetation of roads no longer needed for management? (Franklin, et al p 37)The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88), but does recognize that there is a need for temporary road construction. The DEIS notes that there is a need for the temporary roads to allow for access (DEIS p 319), but the DEIS does note that these temporary roads are to be decommissioned immediately after use (DEIS page 40, p 63, p 81, p 88), as well as an additional 904 miles of roads that are not needed for management of the area, as is suggested by the Franklin, et al article. Finally, the Franklin, et al article asks the following question: Does the plan identify and maintain (or create) roadless areas and low road-density watershed as refuges from human activity? The DEIS discloses the need to decommission roads (DEIS p 28-29), but the purpose and need is not to create roadless areas or low road density watersheds. The transportation specialist report for the FEIS will be more explicit that Alternative A will continue with the deleterious effects of roads that you have pointed out and that the action alternatives will actually decrease these effects.

Artley, Dick	"The authors warned that cutting roads into current roadless areas could bring much more harm to wildlife, soil and fisheries than the beetle-killed trees pose to the forest."	There will be no roads built in roadless areas within the 4FRI analysis area. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The effects of roads to wildlife is discussed in the DEIS on pages 185-186, 202, 204, 205, 208 – 210, and 219-221. Since the purpose and need of the project is not focus on the removal beetle-killed trees but for the restoration of ponderosa pine forest, this document is not relevant to the wildlife analysis done for the project.
Artley, Dick	"Rarely can roads be designed and built that have no negative impacts on streams. Roads modify natural drainage patterns and can increase hillslope erosion and downstream sedimentation. Sediments from road failures at stream crossings are deposited directly into stream habitats and can have both on-site and off-site effects. These include alterations of the channel pattern or morphology, increased bank erosion and changes in channel width, substrate composition, and stability of slopes adjacent to the channels." "All of these changes result in important biological consequences that can affect the entire stream ecosystem. One specific example involves anadromous salmonids, such as salmon and steelhead, that have complex life histories and require suitable stream habitat to support both juvenile and adult life stages." "A healthy fishery requires access to suitable habitat that provides food, shelter, spawning gravel, suitable water quality, and access for upstream and downstream migration. Road-stream crossing failures have direct impacts on all of these components."	This publication provides a comprehensive review of the ecological effects of forest roads, and more specifically, the effects of stream crossing. These adverse effects are not refuted. Please see response #8-4/4 for the specific response concerning the effects on water quality, aquatic species, wildlife, and noxious weed dispersal. The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Barry Noon, a professor of wildlife ecology at Colorado State University, noted that scientific research has consistently shown the adverse effects of roads on hydrologic processes and fish and wildlife populations. " "One of the key things to recognize is the effects of the roads extend far beyond their immediate footprint," Noon said. For example, "in terms of hydrology, the roads are leading to faster runoff of water, often with great increases in sedimentation, particularly following storm events, and roads in watersheds often lead to increases in the intensity of floods." " These changes degrade	This web page citation includes a discussion of the adverse effects of road systems on hydrologic processes, which are not refuted. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus

	fish habitat because of the increased sedimentation that leads to decreases in water quality, Noon said. And roads fragment wildlife habitat and create areas that animals avoid, often as result of increased hunting, he said."	decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.
Artley, Dick	"Roads and skid trails have been identified as a major contributor to increased turbidity of water draining logging areas resulting in increases from 4 to 93 parts per million (Hoover, 1952). Forest roads have been found to have erosion rates from one to three orders of magnitude greater than similar undisturbed areas (Megahan, 1974) and perhaps account for as much as 90 percent of all forest erosion (Megahan, 1972). Forest roads can also cause soil erosion and stream sedimentation, which adversely impact on the nation's water quality (Authur et al., 1998).	This web page citation includes a discussion of the adverse effects of road systems on hydrologic processes, which are not refuted. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Roads have well-documented, short- and long-term effects on the environment that have become highly controversial, because of the value society now places on unroaded wildlands and because of wilderness conflicts with resource extraction." "(Road) consequences include adverse effects on hydrology and geomorphic features (such as debris slides and sedimentation), habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, degraded water quality and chemical contamination, degraded aquatic habitat, use conflicts, destructive human actions (for example, trash dumping, illegal hunting, fires), lost solitude, depressed local economies, loss of soil productivity, and decline in biodiversity."	This publication provides a comprehensive description of the effects of forest roads, which include physical, ecological, geomorphic and hydrologic effects, indirect and landscape level effects (such as effects on aquatic habitat, terrestrial vertebrates, and biodiversity conservation), and socioeconomic effects (such as passive-use value, economic effects on development and range management). These effects are not refuted. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88),

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Artley, Dick	"Fires in the roaded areas are more intense, due to drier conditions, wind zones on the foothill/valley interface, high surface-fuel loading, and dense stands."	Volume 1 is what comes up from the link given. We were not able to find Volume 2. The quote could not be found in Volume 1.
Artley, Dick	"Many forested landscapes are fragmented by roads, but our understanding of the effects of these roads on the function and diversity of the surrounding forest is in its infancy. I investigated the effect of roads in otherwise continuous forests on the macroinvertebrate fauna of the soil. I took soil samples along transects leading away from the edges of unpaved roads in the Cherokee National Forest in the Southern Appalachian mountains of the United States. Roads significantly depressed both the abundance and the richness of the macroinvertebrate soil fauna. Roads also significantly reduced the depth of the leaf-litter layer. These effects persisted up to 100 m into the forest. Wider roads and roads with more open canopies tended to produce steeper declines in abundance, richness, and leaf-litter depth, but these effects were significant only for canopy cover and litter depth. The macroinvertebrate fauna of the leaf litter plays a pivotal role in the ability of the soil to process energy and nutrients. These macroinvertebrates also provide prey for vertebrate species such as salamanders and ground-foraging birds. The effect of roads on the surrounding forest is compounded by the sprawling nature of the road system in this and many other forests. My data suggest that even relatively narrow roads through forests can produce marked edge effects that may have negative consequences for the function and diversity of the forest ecosystem."	This article is based on research conducted in the Southern Appalachian Mountains and is not pertinent to the 4FRI analysis areas. While the ecological effects of roads are not refuted, this article does not directly relate to temporary road construct as proposed under the action alternatives. The DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. The effects of roads on aquatic species can be found in the DEIS at p 249, p 251-255) and BMP's to minimize impacts from roads are located at page 583-585 (BMP's SW10-SW20) and within the fisheries specialists report at multiple locations, including BMP's @ p 32-34, affects (p 60, p 64-65, p 66 and the final species effects (that includes the effects of roads and all other activities proposed within the analysis area) are included in pages 82-107.
Artley, Dick	"Roads remove habitat, alter adjacent areas, and interrupt and redirect ecological flows. They subdivide wildlife populations, foster invasive species spread, change the hydrologic network, and increase	This article is largely related to road development in rural Wisconsin and associated subsequent habitation/development of roaded areas. The ecological effects of road networks are discussed. While the

	human use of adjacent areas. At broad scales, these impacts cumulate and define landscape patterns."	ecological effects of roads are not refuted, this article does not directly relate to temporary road construct as proposed under the action alternatives. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.
Artley, Dick	"Last winter was unusually wet in the Pacific Northwest. The result was landslides all over caused by logging roads; five people died, spawning streams were ruined, water supplies were contaminated and the flooding was tremendously aggravated. According to David Bayles, conservation director of the Pacific Rivers Council, aerial surveys documented more than 650 landslides in February in Washington and Oregon alone. The stupidest and most dangerous practice is allowing logging roads on steep slopes - that's really asking for it. You may ask yourself why the taxpayers are expected to pony up to build roads for profitable logging companies. Build roads for the timber companies in order to stimulate the U.S. logging, paper and building industries. There's just one problem. A lot of U.S. logs get shipped overseas, mostly to Japan. We're actually subsidizing Japanese companies while doing terrible damage to our environment and not helping the U.S. job scene much except when it comes to cutting Start with the assumption that the U.S. Forest Service a component of the Department of Agriculture, is simply an auxiliary branch of the timber industry and you'll pretty much have the picture of what's going on. Last winter, the Forest Service refused a bid at a timber auction from an environmentalist who wanted to	Thank you for this opinion piece about the Pacific Northwest. The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area.

	save, not harvest, a stand of evergreens in the Okanogan National Forest in Washington. Instead, the Forest Service accepted a bid of $15,000 from a logging company that cut 3.5 million board-feet of lumber in that stand. Try to find a price like that at Home Depot."	
Artley, Dick	"Although disturbance patches are created by peak flow and debris flow disturbances in mountain landscapes without roads, roads can alter the landscape distributions of the starting and stopping points of debris flows, and they can alter the balance between the intensity of flood peaks and the stream network's resistance to change."	The article provides a synopsis of the biological and ecological effects of roads, particularly where roads intersect streams. The research was conducted in the H. J Andrews Experimental Forest in Oregon, so it is not directly relevant to this project. The effects disclosed are not refuted, but not all are relevant to the semi-arid Southwest. However, some general monitoring recommendations are provided that could prove useful for detecting adverse effects of roads intersecting perennial streams. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"In the Pacific Northwest, the two main processes that contribute to sediment production are mass failure and surface erosion from forest roads (Fredriksen 1970, Reid and Dunne 1984). In the Clearwater River basin in the State of Washington, as much as 40 percent of the sediment produced in the watershed was attributed to logging roads (Reid 1980)."	The effects of roads on water quality, including the potential for sediment delivery, are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction,

		decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"It is indisputable that roads are one of the greatest threats to the ecological integrity of forested systems and associated river, wetland, lake, and coastal ecosystems. Yet, the USFS has failed to adopt a policy that mandates reversing the worst ecological effects of roads, or that precludes incursion of roads into roadless areas. Despite widespread recognition of these facts, the USFS diverts staff and money to extraordinarily costly salvage logging projects at the expense of reducing the extent of the road network or undertaking needed fine-fuels reductions in unburned forests."	The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The project is not proposing any salvage logging and is proposing restoration activities that will reduce fine fuels across the landscape area.
Artley, Dick	"Forest fragmentation, as scientists call the intentional felling of woodland, is actually two processes. In populated areas such as the Atlantic seaboard, it means reduction in the size of forest tracts, usually due to suburbanization and development. In less inhabited areas--northern New England, for example--forest fragmentation refers to isolation of one patch of forest from another by logging, or by the building of roads or power lines."	This article discusses the effects of forest fragmentation on songbirds on the east coast caused by development and the building of roads so it is not directly relevant to the 4FRI analysis area. But the DEIS discloses the effects of roads on wildlife in multiple locations, including but not limited to p 180-81, p 184-86, p 194, p200-02, p 205-14, p218-20, p 223, p242, p 249, p 251-55. The wildlife specialist report further discusses and discloses the effects of roads on wildlife species and habitat p 29 (specifically what are the effects of roads as an analysis question), p 35, p 89-90, p 144, p 152, p 180-81, p 183, p 190-91, p 198-99, p 201-07, p 209, p 238-41, p 270, p 272-74, p 300-04, p 322, p 329-30, p 344, p 352-54, p 356-59, p 361-62, p364-65, p 373, p 375-78, p 380-82, p 384, p 387-90, p 393-94, p 397-98, p 405, p 408, p 415, p 426, p 433, p443. P 446, p 449-50, p 455-57, p 474, p 476-78, p 558, p 565, p 573, p 581, p 590-91, p 620, p 706-18, p 723, p 726-28, p 732, p 734-35, p 738, p 740-43, p 745, p 749-751, and p 752-55.For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.
Artley, Dick	"The compaction of forest road soils is known to reduce aeration, porosity, infiltration rates, water movement, and biological activity in soils. Research indicates that soil bulk density, organic matter, moisture, and litter depths are much lower on roads than on nearby forest lands. Macropores, which provide soil drainage and infiltration, have been shown to significantly decrease in size as a result of road construction and use. Reduced infiltration and increased compaction promote soil erosion, especially during the seasonal southwestern monsoon rains (Elseroad 2001)." "Physical disturbances caused by road construction and vehicle use create	The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The effects of roads on water quality are outlined in the DEIS on page 111 and are summarized in Table 32 and Table 34. Best management practices to minimize impacts from roads are located at page 583-585 (BMP's SW10-SW20) and within the water quality riparian specialist report in multiple locations. Page 9 of the specialist report identifies roads as a

	ideal conditions for colonization by invasive exotic plant species. The use of roads by vehicles, machinery, or humans often aids the spread of exotic plant seeds. Once established, they can have long-term impacts on surrounding ecosystems and can be difficult to remove." "Roads are known to cause habitat fragmentation. Many create ecological 'edges' with different plant species, light levels, and hiding cover, all of which may alter animal survival, reproductive success, and movement patterns. The introduction of exotic plants can disrupt the availability of native vegetation used by wildlife for food and shelter (Trombulak and Frissell 1999)." "Forest roads often develop a water-repellent soil layer caused by lack of vegetative cover and changes in soil composition. This can substantially influence how runoff is processed. Erosion, the formation of water channels beside the road, and increased sediment loads in nearby streams are common results of this process (Baker 2003)." "Because they provide easier access to many forest tracts, forest roads often allow more human-caused fires to be ignited."	potential sediment source. Desired conditions for roads in relation to water quality are displayed on page 12, the effects of roads are located within the specialist report at p 44-45 (the affected environment), direct and indirect effects (Table 9 p 53-56, p 59, p 62-63, p 68, p75-76, p 81, p 88).The DEIS discloses the effects of roads on dispersal of weeds at page 258 and in the Design Features/Mitigations/BMP section of the DEIS at p567-68 in the Botany Specialist Report, p 100, 103-04, p 109, p115-16, p 119-21, p 123-24, p 127-28) including Best Management Practices and mitigation measures specifically designed to minimize noxious weed spread (BMP's 17-24 and 26-27, p 20-21).For effects to terrestrial habitats from fragmentation and increased access see response to 8-4/1.
Artley, Dick	"Almost everywhere people live and work they build and use unimproved roads, and wherever the roads go, a range of environmental issues follows." "Among the environmental effects of unimproved roads, those on water quality and aquatic ecology are some of the most critical. Increased chronic sedimentation, in particular, can dramatically change the food web in affected streams and lakes." "The nearly impervious nature of road surfaces (or treads) makes them unique within forested environments and causes runoff generation even in mild rainfall events, leading to chronic fine sediment contributions." "If we look at the issue of what we need to learn or the research priorities for forest road hydrology, I would argue that the areas of cutslope hydrology and effectiveness of restoration efforts are perhaps most critical." "At a few sites in the mountains of Idaho and Oregon a substantial portion of the road runoff (80-95%) came from subsurface flow intercepted by the cutslope (Burroughs et al., 1972; Megahan, 1972; Wemple, 1998)."	The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS at p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The effects of roads on water quality are outlined in the DEIS on page 111 and are summarized in Table 32 and Table 34. Best management practices to minimize impacts from roads are located at page 583-585 (BMP's SW10-SW20) and within the water quality riparian specialist report in multiple locations. Page 9 of the specialist report identifies roads as a potential sediment source. Desired conditions for roads in relation to water quality are displayed on page 12, the effects of roads are located within the specialist report at p 44-45 (the affected environment), direct and indirect effects (Table 9 p 53-56, p 59, p 62-63, p 68, p75-76, p 81, p 88).The effects of roads on aquatic species can be found in the DEIS at p 249, p 251-255) and BMP's to minimize impacts from roads are located at page 583-585 (BMP's SW10-SW20) and within the fisheries specialists report at multiple locations, including BMP's at p 32-34, affects (p 60, p 64-65, p 66 and the final species effects (that includes the effects of roads and all other activities proposed within the analysis

		area) are included in pages 82-107.
Artley, Dick	"Roads in the watershed contribute to sediment production by concentrating runoff, thereby increasing sediment load to the stream network. Most unimproved (dirt) roads connect either directly or indirectly with streams and, therefore, act as extensions of stream networks by effectively increasing watershed drainage density and subsequently sediment loads to streams. In the South Fork subwatershed of Squaw Creek, road connectivity has resulted in an increase in effective drainage density of approximately 250%. Throughout the Squaw Creek watershed, it is estimated that dirt roads potentially contribute as much as 7,793 metric tons/year to the watershed sediment budget."	The publication provides a detailed description of a study located northwest of Lake Tahoe, California to improve understanding of the geomorphic processes influencing sediment movement through a subalpine tributary to a 303(d) listed stream (Squaw Creek) by conducting a sediment source assessment. The literature review provides a good synopsis of the adverse effects of roads on hydrology and sediment movement. However, the project was undertaken in a subalpine catchment. There are no treatments proposed in subalpine area as part of this proposed project. The article is therefore not directly relevant to this proposed project. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"One of the greatest impacts of roads and (especially motorized) trails is their effect on the hydrology of natural landscapes, including the flow of surface and ground water and nutrients. These hydrologic effects are re¬sponsible for changes to geomorphic processes and sediment loads in roaded areas (Luce and Wemple 2001)." (pg. 12)	This reference is a newsletter that describes, in general terms the effects of roads and what restoration entails. It's a good general information publication and provides some meaningful information on road decommissioning/obliteration and discusses funding mechanisms to facilitate ecological restoration. However, it is not directly relevant to the 4FRI project. The effects of roads discussed in this publication are not refuted. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88),

		thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. In addition, the transportation specialist report for the FEIS will be more explicit that Alternative A will continue with the deleterious effects of roads that you have pointed out and that the action alternatives will actually decrease these effects.
Artley, Dick	"A study was made on 344 miles of logging roads in northwestern California to assess sources of erosion and the extent to which road-related erosion is avoidable. At most, about 24 percent of the erosion measured on the logging roads could have been prevented by conventional engineering methods. The remaining 76 percent was caused by site conditions and choice of alignment. On 30,300 acres of commercial timberland, an estimated 40 percent of the total erosion associated with management of the area was found to have been derived from the road system."	This publication describes a study that was undertaken to assess sediment transport distances downslope of forest roads and characterize the factors influencing these distances. The study references sites in Georgia and Alabama, which have distinctly different soil types and precipitation patterns that this region. However, some general BMPs are recommended. BMPs outlined in the DEIS for this project exceed those recommended in the referenced publication. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide
Artley, Dick	"Research has shown that roads can have adverse impacts on the water quality on the forest landscape (Authur et al. 1998; Binkley and Brown 1993; Megahan et al. 1991). The forest road system has been identified by previous research as the major source of soil erosion on forestlands (Anderson et. al 1976; Patric 1976; Swift 1984; Van Lear et al. 1997). Furthermore, roads are cited as the dominant source of sediment that reaches stream channels (Packer 1967; Trimble and Sartz 1957; Haupt 1959)."	

		specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS at p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The DEIS discloses the effects of roads on wildlife in multiple locations, including but not limited to p 180-81, p 184-86, p 194, p200-02, p 205-14, p218-20, p 223, p242, p 249, p 251-55. The wildlife specialist report further discusses and discloses the effects of roads on wildlife species and habitat p 29 (specifically what are the effects of roads as an analysis question), p 35, p 89-90, p 144, p 152, p 180-81, p 183, p 190-91, p 198-99, p 201-07, p 209, p 238-41, p 270, p 272-74, p 300-04, p 322, p 329-30, p 344, p 352-54, p 356-59, p 361-62, p364-65, p 373, p 375-78, p 380-82, p 384, p 387-90, p 393-94, p 397-98, p 405, p 408, p 415, p 426, p 433, p443. P 446, p 449-50, p 455-57, p 474, p 476-78, p 558, p 565, p 573, p 581, p 590-91, p 620, p 706-18, p 723, p 726-28, p 732, p 734-35, p 738, p 740-43, p 745, p 749-751, and p 752-55.
Artley, Dick	"Overall, roads had a greater impact on landscape structure than logging in our study area. Indeed, the 3-fold increase in road density between 1950-1993 accounted for most of the changes in landscape configuration associated with mean patch size, edge density, and core area."	
Artley, Dick	Road construction in remote areas appears to be the major long term impact of resource extraction industries and the most significant problem facing grizzly bears in most locations. Open roads are an influence in all 5 ways that people affect bears. Vehicles on roads can harass bears, displace them from quality habitats, and cause reduced bear use of altered habitats, such as cutting units. Bears that are displaced from roads may cause social disruption in areas away from roads. Finally, roads permit access for many people and some of these will shoot bears." (Pg. 62)	The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The article is discussing the impacts to grizzly bears. Grizzly bears are not found in Arizona and this article is not relevant to the project area. But please see the response to
Artley, Dick	"Erosion from forest roads can be a large source of sediment in watersheds managed for timber production."	The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus

		decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. The article provides economic justification for not constructing new forest roads, given the density of existing roads networks and the adverse ecological effects, particularly in the Western U.S. This article is relevant to the 4FRI project since the proposed projects includes decommissioning of 904 miles of existing roads, no new construction of permanent roads, and decommissioning of constructed temporary roads upon completion of activities. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Today, addressing the adverse impacts of forest roads is consistently identified as one of the highest watershed restoration priorities in U.S. forests-in many forested watersheds in the western United States there is a greater road density than stream density. It is simply irrational to spend millions of dollars subsidizing further forest road construction when we are simultaneously spending millions of dollars to offset detrimental effects associated with similar actions in the past."	
Artley, Dick	"Nothing is worse for sensitive wildlife than a road. Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity - habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting - are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as	This article is relevant to the 4FRI project since the proposed projects includes decommissioning of 904 miles of existing roads, no new construction of permanent roads, and decommissioning of constructed temporary roads upon completion of activities. See response to #217-1 for effects to wildlife from fragmentation and road access. See response to #217-29 for effects of roads on water quality and spread of weeds is discussed. See response to #217-28 for the disclosed effects from roads on wildlife.

Artley, Dick	access corridors that encourage development, logging and poaching of rare plants and animals." "Most public agencies disregard the ecological impacts of roads, and attempt to justify timber roads as benefiting recreation and wildlife management. Even when a land manager recognizes the desirability of closing roads, he or she usually contends that such closures would be unacceptable to the public." "The Forest Service and other public agencies will claim that road closures, revegetation, and other restorative measures are too expensive to be implemented on a broad scale. But much of the approximately $400 million of taxpayers' money squandered annually by the Forest Service on below-cost timber sales goes to road-building. Road maintenance is also expensive. Virtually all of this money could be channeled into road closures and associated habitat restoration. This work would be labor-intensive, and providing income to the many laid off loggers, timber sale planners, and road engineers -- for noble jobs, rather than jobs of destruction!" "Numerous studies have reported lower densities of breeding Ovenbirds (Seiurus aurocapillus) adjacent to forest edges. However, none of these studies has considered habitat use and reproductive success to address mechanisms underlying the observed pattern, and most were conducted in fragmented landscapes and ignored juxtapositions of forest with narrow openings such as roads. We studied the influence of forest roads on Ovenbird density in an extensively forested region of Vermont, evaluating habitat use and reproductive success relative to mechanisms proposed to explain the density-edge relationship. Territory densities on seven study plots were 40% lower within edge areas (0 to 150 m from unpaved roads) than within interior areas (150 to 300 m from roads). We simulated the distribution of Ovenbird territories and concluded that passive displacement, where birds perceive habitat interfaces as boundaries and limit their territories entirely to forest habitat, did not account for the observed density-edge pattern. Territory size was inversely related to distance from roads, providing an alternative explanation for reduced densities near edges and suggesting that habitat quality was higher away from roads. Pairing success was lower within edge areas than within interior zones, but the difference was not statistically significant. The proportion of males that produced	This article is relevant to the 4FRI project since the proposed projects include decommissioning of 904 miles of existing roads, no new construction of permanent roads, and decommissioning of constructed temporary roads upon completion of activities.

	fledglings did not differ between edge and interior areas. We conclude that habitat quality for Ovenbirds may be lower within 150 m of unpaved roads in extensive forested landscapes, affecting territory density and possibly reproductive success." "Increasingly, previously extensive, continuous tracts of forest are being reduced to widely dispersed patches of remnant forest vegetation by logging and road-building, but few measures of the effects of roads on forest fragmentation are available. Fragmentation affects animal populations in a variety of ways, including decreased species diversity and lower densities of some animal species in the resulting smaller patches. This study seeks to quantify the effects of roads and logging activities on forest habitat." "Roads precipitate fragmentation by dissecting previously large patches into smaller ones, and in so doing they create edge habitat in patches along both sides of the road, potentially at the expense of interior habitat. As the density of roads in landscapes increases, these effects increase as well. McGurk and Fong (1995) considered the additive effects of clearcuts and roads, but did not measure the amount of associated edge habitat. Thus a more direct measurement of the impacts of
Artley, Dick	roads on landscapes is needed."
	Please see the response to #217-40.
Artley, Dick	"Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface."
	This article presents a road sediment study conducted in NW Washington's Olympic mountains. Soils in the project area are Inceptisols, which are very dissimilar to soils in the project area. Precipitation patterns are also vastly different than those of the Southwestern U.S. The publication is therefore not relevant to this proposed project. However, road sediment research methodologies are presented that would improve understand of the effects of roads on in-stream water quality. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide

Artley, Dick	"Roads are associated with high sediment inputs and altered hydrology, both of which can strongly influence downstream channel habitats. Roads are also important as a source of indirect human impacts and as an agent of vegetation change and wildlife disturbance." "Any ground disturbance increases the potential for erosion and hydrologic change, and roads are a major source of ground disturbance in wildlands. Compacted road surfaces generate overland flow, and much of this flow often enters the channel system, locally increasing peak flows. Localized peak flows are also increased where roads divert flow from one swale into another, and where roadcuts intercept subsurface flows." "Overland flow from the road surface is a very effective transport medium for the abundant fine sediments that usually are generated on road surfaces. Road drainage also can excavate gullies and cause landslides downslope in swales. Cut and fill slopes are often susceptible to landsliding, and road-related landsliding is the most visible forestry-related erosional impact in many areas."	specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities. The publication provides a synopsis of the effects of forest roads on a variety of ecosystem functions, which are not unlike those within the project area. It further provides guidance on analytical methods for assessing and inventorying forest road network needs that would facilitate a more sustainable and ecologically sound road network. This information is not refuted and is relevant to the 4FRI project. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Disturbances from roadbuilding and logging changed the sediment/discharge relationship of the South Fork from one which was supply dependent to one which was stream power dependent, resulting in substantial increases in suspended sediment discharges." "Road construction and logging appear to have resulted in increases in average turbidity levels (as inferred from suspended sediment increases) above those permitted by Regional Water Quality Regulations."	The publication describes a long-term study of the effects of logging and road building Ft. Bragg, CA. It is not directly relevant to this project, although it does identify increased surface water turbidity as a concern. This concern would also apply within the 4FRI analysis area and is discussed in the EIS. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14,

		SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Sediment eroded from gravel roads can be a major component of the sediment budget in streams in this region (Van Lear, et al, 1995)."	The publication presents a study undertaken in the southern Appalachian Mountains in northern Georgia and southern Tennessee. Soil types and precipitation patterns are vastly different than those in the Southwestern U.S. This publication is therefore not relevant to this project. Please see response to #217-29 for the discussion of the effects of roads on water quality, BMPs, and mitigation measures.
Artley, Dick	Early studies of elk were among the first to address effects of roads on wildlife, establishing a precedent for subsequent research on a wide range of terrestrial and aquatic species. These early elk-roads studies included those reported in a symposium on the topic in 1975 (Hieb 1976), the seminal studies of Jack Lyon in Montana and northern Idaho (Lyon 1979, 1983, 1984), the Montana Cooperative Elk-Logging Study (Lyon et al. 1985), and work by Perry and Overly (1977) in Washington and Rost and Bailey (1979) in Colorado. As research and analysis techniques have become more sophisticated, particularly with the advent of geographic information systems (GIS) and high-resolution remote imagery, the study of effects of roads on terrestrial and aquatic communities has evolved into a unique discipline of "road ecology" (Forman et al. 2003). Road effects are far more pervasive than originally believed and include such disparate consequences as population and habitat fragmentation, accelerated rates of soil erosion, and invasion of exotic plants along roadways. Indeed, "in public wildlands management, road systems are the largest human investment and the feature most damaging to the environment" (Gucinski et al. 2001:7). Summaries of the effects of roads on wildlife habitats and biological systems in general have been compiled by Forman and Alexander (1998), Trombulak and Frissell (2000), Gucinski et al. (2001), Forman et al. (2003) and Gaines et al. (2003)."	The article discusses the effects of roads on terrestrial and aquatic ecosystems that are germane to the 4FRI analysis. This article is relevant to the 4FRI project since the proposed projects includes decommissioning of 904 miles of existing roads, no new construction of permanent roads, and decommissioning of constructed temporary roads upon completion of activities. See response to #217-1 for effects to wildlife from fragmentation and road access. See response to #217-29 for effects of roads on water quality and spread of weeds is discussed. See response to #217-28 for the disclosed effects from roads on wildlife.
Artley, Dick	"The consequences of road construction to wildlife are generally negative. Roads result in increased human access, habitat fragmentation, disturbance, and in some cases direct mortality due	The discussion about grizzly bears is not relevant to the 4FRI project since there are no grizzly bears in Arizona. Please see response to #217-1 for effects of roads on wildlife.

	to vehicle collisions." "Research has documented an 80% decline in grizzly bear habitat use within 1 km of open roads used by motorized vehicles in Montana9. This has been ascribed either to bears avoiding humans or to the selective over-harvest of bears habituated to humans that would otherwise more fully use areas heavily influenced by people."	
Artley, Dick	"The effects of forest roads on hydrology are related to the effects of forest clearing. Most logging requires road access, and the roads often remain after the logging, so there are both short and long-term effects.94 Forest road surfaces are relatively impermeable. Water readily runs over the road surface and associated roadside ditches, often directly to a stream channel, with the net effect of extending channel networks and increasing drainage density.95 In addition to providing conduits for overland flow, forest roads involve slope-cuts and ditching that may intersect the water table and interrupt natural subsurface water movement.96 This diversion of subsurface water may be quantitatively more important than the overland flow of storm water in some watersheds.97 The importance of roads in altering basin hydrology has been underscored in paired-watershed studies and recent modeling studies.98 " (Pgs. 730 and 731)	The effects of roads on water quality, including the potential for sediment delivery, are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Roads are often the major source of soil erosion from forested lands (Patric 1976)."	Please see response to #217-48.
Artley, Dick	"Generally, soil loss is greatest during and immediately after construction."	Please see response to #217-48.
Artley, Dick	"More subtle causes of habitat loss include the construction of roads and power lines. These linear barriers also have been correlated with a decline in neotropical migrant songbirds (Berkey 1993; Boren et al. 1999; Ortega and Capen 2002). Whether by forest conversion or the construction of roads and power lines, fragmentation subdivides habitat into smaller and smaller parcels. The result is an increase of edge habitat, or the boundary between intact forest and surrounding impacted areas. Small forests with large amounts of edge habitat are a hostile landscape for nesting neotropical migratory songbirds. In these areas, songbirds face two great threats: 1) the loss of eggs and nestlings to predators and, 2) parasitism by cowbirds."	This is an unpublished paper that discusses the effects to songbirds from forested area has been logged, converted to agriculture or suburban landscapes. It also discusses effects to songbirds from road and power line constructions. The DEIS discusses habitat connectivity for wildlife species on pages 174 and on page 40 of the wildlife specialist report. The complete analysis for bridge habitat for canopy-dependent wildlife can be found in appendix G of the DEIS and appendix 3 of the wildlife report. The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS at p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The purpose of the 4FRI project is to reestablish and

		restore forest structure and pattern, forest health and vegetation composition and diversity (page 8 DEIS). This would restore habitat for songbirds that historically uses the analysis area.
Artley, Dick	"Roads are a widespread and increasing feature of most landscapes. We reviewed the scientific literature on the ecological effects of roads and found support for the general conclusion that they are associated with negative effects on biotic integrity in both terrestrial and aquatic ecosystems. Roads of all kinds have seven general effects: mortality from road construction, mortality from collision with vehicles, modification of animal behavior, alteration of the physical environment, alteration of the chemical environment, spread of exotics, and increased use of areas by humans. Road construction kills sessile and slow-moving organisms, injures organisms adjacent to a road, and alters physical conditions beneath a road. Vehicle collisions affect the demography of many species, both vertebrates and invertebrates; mitigation measures to reduce roadkill have been only partly successful. Roads alter animal behavior by causing changes in home ranges, movement, reproductive success, escape response, and physiological state. Roads change soil density, temperature, soil water content, light levels, dust, surface waters, patterns of runoff, and sedimentation, as well as adding heavy metals (especially lead), salts, organic molecules, ozone, and nutrients to roadside environments. Roads promote the dispersal of exotic species by altering habitats, stressing native species, and providing movement corridors. Roads also promote increased hunting, fishing, passive harassment of animals, and landscape modifications. Not all species and ecosystems are equally affected by roads, but overall the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian systems. More experimental research is needed to complement post-hoc correlative studies. Our review underscores the importance to conservation of avoiding construction of new roads in roadless or sparsely roaded areas and of removal or restoration of existing roads to benefit both terrestrial and aquatic biota."	Please see response to #217-39.
Artley, Dick	"Roads are a major contributor to habitat fragmentation because they divide large landscapes into smaller patches and convert interior	Please see the response to #217-1.

	habitat into edge habitat. As additional road construction and timber harvest activities increase habitat fragmentation across large areas, the populations of some species may become isolated, increasing the risk of local extirpations or extinctions (Noss and Cooperrider 1994)." "Habitat fragmentation creates landscapes made of altered habitats or developed areas fundamentally different from those shaped by natural disturbances that species have adapted to over evolutionary time (Noss and Cooperrider 1994 in Meffe et al. 1997). Adverse effects of habitat fragmentation to both wildlife populations and species include: "Increased isolation of populations or species, which leads to: * Adverse genetic effects; i.e. inbreeding depression (depressed fertility and fecundity, increased natal mortality) and decreased genetic diversity from genetic drift and bottlenecks, * Increased potential for extirpation of localized populations or extinction of narrowly distributed species from catastrophic events such as hurricanes, wildfires or disease outbreaks, * Changes in habitat vegetative composition, often to weedy and invasive species, * Changes in the type and quality of the food base, * Changes in microclimates by altering temperature and moisture regimes, * Changes in flows of energy and nutrients, * Changes in the availability of cover and increases edge effect, bringing together species that might otherwise not interact, potentially increasing rates of predation, competition and nest parasitism, and * Increased opportunities for exploitation by humans, such as poaching or illegal collection for the pet trade."	
Artley, Dick	"Roads in forested areas increase trapping pressures for martens and fishers, resulting in significantly higher captures in roaded versus unroaded areas (Hodgman and others 1994) and in logged versus unlogged areas, in which the difference was again attributed to higher road densities in logged stands (Thompson 1994). Secondary roads also might increase the likelihood that snags and logs will be removed for fuel wood. This could impact fishers, martens and flammulated owls, and also could have a negative effect on the prey base for goshawks (Reynolds and others 1992)." "An additional, indirect effect of roads is that road avoidance leads to underutilization of habitats that are otherwise high quality."	The article is based on management implications for the Interior Columbia Basin and does not have a direct relevence to the 4FRI project. Trapping pressures for the marten and fisher are not relevant to this analysis since they are not found in the 4FRI project area. See response to 8-4/29 for roads effects to wildlife within the analysis area. Specifically, see p 457 of the Wildlife specialist report for management of road densities in Northern Goshawk habitat.
Artley, Dick	"According to the DEIS, the Forest now manages a total of 5,914	These are comments received by the Rogue River-Siskiyou National

	miles of roads across the Forest. Scientific literature has established that roads have numerous widespread, pervasive and, if left untreated, long-lasting biological and physical impacts on aquatic ecosystems that continue long after completion of construction. (Angermeier et al. 2004). Roads increase surface water flow, alter runoff patterns, alter streamflow patterns and hydrology, and increase sedimentation and turbidity. Roads are the main source of sediment to water bodies from forestry operations in the United States. (US EPA 2002). Road construction can lead to slope failures, mass wasting and gully erosion. Road crossings can act as barriers to movement for fish and other aquatic organisms, disrupting migration and reducing population viability. (Schlosser and Angermeier 1995). Chemical pollutants that enter streams via runoff, such as salt and lead from road use and management, compound these impacts. Most of these adverse effects are persistent and will not recover or reverse without human intervention. The techniques for road remediation are well established, agreed upon and readily available. (Weaver et al. 2006)." (Pg. 2)	Forest on the proposed Motorized Vehicle Use Draft Environmental Impact Statement (DEIS). These comments are not relevant to the 4FRI project, although some similar roads-related concerns similar to those found within the 4FRI project area are identified. The effects of roads on water quality, including the potential for sediment delivery are disclosed in the Water Quality and Riparian Area Specialist's Report, pages 48 and 49 and pages 53 and 54. In addition, the DEIS proposes no new permanent road construction (DEIS page 40, p. 63, p. 81, p. 88). The DEIS proposes a reduction of current road mileage within the project area through decommissioning of 904 miles of roads (DEIS page 41, p. 63, Table 18 p. 74, p. 81, p. 88), thus decreasing the adverse effects of roads at both local and landscape scales Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Artley, Dick	"Fires do not leave a large road network in place (assuming the blaze was not suppressed otherwise there may be dozer lines, etc.). Logging creates roads that fragment habitat and generally increase human access, both of which affect the use of the land by wildlife. Moreover, roads and logging equipment can become vectors for the dispersal of weeds."	The DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The DEIS discloses the effects of roads on wildlife in multiple locations, including but not limited to p 180-81, p 184-86, p 194, p200-02, p 205-14, p218-20, p 223, p242, p 249, p 251-55. The wildlife specialist report further discusses and discloses the effects of roads on wildlife species and habitat p 29 (specifically what are the effects of roads as an analysis question), p 35, p 89-90, p 144, p 152, p 180-81, p 183, p 190-91, p 198-99, p 201-07, p 209, p 238-41, p 270, p 272-74, p 300-04, p 322, p 329-30, p 344, p 352-54, p 356-59, p 361-62, p364-65, p 373, p 375-78, p 380-82, p 384, p 387-90, p 393-94, p 397-98, p 405, p 408, p 415, p 426, p 433, p443. P 446, p 449-50, p 455-57, p 474, p 476-78, p 558, p 565, p 573, p 581, p 590-91, p 620, p 706-18, p 723, p 726-28, p 732, p 734-35, p 738, p 740-43, p 745, p 749-751, and p 752-55.The DEIS discloses the effects of roads on dispersal of weeds at page 258 and in the Design Features/Mitigations/BMP section of the DEIS at p567-68 in the Botany

		specialist Report p 100, 103-04, p 109, p115-16, p 119-21, p 123-24, p 127-28) including Best Management Practices and mitigation measures specifically designed to minimize noxious weed spread (BMP's 17-24 and 26-27, p 20-21).
Artley, Dick	"Forest fragmentation occurs when large, contiguous blocks of forest are broken up into isolated islands by development, roads, or clearing for agriculture. Just as inbreeding among the royal families of Europe spread hemophilia, forest fragmentation negatively impacts the long term sustainability of both plant and animal communities. Geographic isolation results in inbreeding and diminishes biodiversity."	This is an unpublished article discussing the author's opinions about fragmentation when large, contiguous blocks of forest are broken up into isolated islands by development, roads, or clearing for agriculture. See response to 8-4/1 about the effects of fragmentation on wildlife.
Artley, Dick	"Defining forest health has proven to be something akin to shooting at a moving target. Different groups and different folks often mean different things when they use the term. Attempts to formulate a standard "one size fits all" definition have occupied untold hours of bureaucratic, professional and academic meetings, and consensus remains elusive. Why? To begin with, when we talk about forest health, it is necessary to identify the scale of our focus. Are we talking about a pine plantation, a particular forest ownership, a county, a state, a region, etc.? Such scale is not always defined, and is often prioritized differently by different people for varying reasons. Another reason seems to be that one's concept of "healthy" is often inextricably linked to what he or she desires from the forest. What may be undesirable to forest managers emphasizing timber production may well be desirable to others interested primarily in wildlife habitat or biodiversity, and vice versa."	(218-1) The quoted article goes on to say: "The Society of American Foresters has adopted what I believe to be a very good (if not short) working definition of forest health as "the perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance… (ref., The Dictionary of Forestry edited by J. A. Helms, 1998)." The 4FRI incorporates this definition in its purpose and need statement where it states "The purpose of the project is to re-establish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, fire, and climate change (FSM 2020.5)." (DEIS, p 8).
Artley, Dick	"Forests change. Disturbance including insects and fires are frequently part of the regenerative process. Rarely is it possible or desirable to maintain a forest at some seemingly idyllic stage of succession. Forest health - including services provided such as water - require managing to maintain natural processes. In the overgrown western U.S., fires and insects are resetting the system in response to years of fire suppression and changing climate. They are doing so in a way that will lead to adaptive and renewed forests, with far improved outcomes than logging could ever hope to achieve. Bush's "Forest Health" initiative will only exacerbate the negative situation. These forests are still extensive and large enough that letting them	Link to this article is broken and a search could not find it. The site (forests.org) is a blog for rainforest protection. The 4FRI project is restoration based; it is not a HFRA project. Please see the response to 218-1 for the 4FRI purpose and need.

	be is the best forest health prescription."	
Artley, Dick	"Mountain pine beetles, Ips beetle species, red turpentine beetles, and other wood boring beetles are all naturally occurring insects on the Black Hills, yet the USFS perceives these insects as a threat to the Forest ecosystem. These insect species do diminish the cash value of some conifers. Accordingly, concerted efforts have been made to rid public forests of what are called "pest insects". However, such a strategy is not wise or feasible. Insects including those mentioned above are integral components of healthy forest ecosystems. These native species do less damage to the forest than the commercial logging program (which completely removes trees and nutrients from the ecosystem). In addition, these insect species are invaluable to the BHNF forest ecosystem. Insects help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs required by wildlife, and provide food to birds and small mammals. By feeding upon dead or dying trees, wood borers and bark beetles provide food to insect gleaning species of birds (such as the black backed woodpecker which is listed as a MIS species on this Forest), create snags that may be utilized by cavity nesting birds in the future and overall are invaluable catalysts in forest evolution - often aiding immensely in the regrowth of forest after fires, blowdowns or other naturally occurring stand removing processes. The potentially significant direct, indirect, and cumulative impacts upon insects and upon the niche of insects in the BHNF forest ecosystem should be thoroughly analyzed in the FEIS."	This is a portion of a comment letter submitted for a salvage logging project in the Black Hills National Forest in South Dakota. The 4FRI project is restoration based and does not include salvage logging. With that being said, the 4FRI DEIS notes the following for the desired conditions for insects and disease. “The desired condition is to move toward a forest structure that would allow beetles and dwarf mistletoe to function at naturally occurring or historic levels. There is a need to manage insect and disease in a manner that reduces, but does not eliminate bark beetle or dwarf mistletoe in order to provide nesting, resting, foraging, and catching sites for birds and mammals including Abert’s/tassel-eared squirrels." (DEIS, p 18)In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.
Artley, Dick	"Insects, including those that feed on and sometimes kill trees, are integral components of healthy forest ecosystems. They help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs that wildlife and fish rely on, and provide food for birds and small mammals. Although insects have been a part of the ecology of temperate forests for millennia, many in the timber industry see them only as agents of destruction. Some foresters believe the solution to the problem is increased logging. A review of over three hundred papers on the subject reveals that there is little or no evidence to support this assumption. There is an urgent need for federal and state agencies and land managers to reevaluate their	The citation could not be verified as the link goes to a site where the publication can be purchased but not viewed. From the description it states the report “demonstrates that industrial logging is not the solution to combating outbreaks of bark beetles or defoliators. “The 4FRI is not industrial logging and the main purpose is not to control forest “pests”. The DEIS lists the desired condition for insects and disease on p 18 of the DEIS and discusses the effects of treatments on forest insects in disease in Chapter 3 of the DEIS...

	current strategy for managing forest insects-which often relies on intensive logging-and to adopt a perspective that manages for forest ecosystem integrity." "Even forest thinning, which is widely promoted as a solution by reducing tree susceptibility to outbreaks, has had mixed results and is unlikely to stem bark beetle epidemics on a large landscape scale, especially during drought cycles. Further, this type of thinning would not be a one-time treatment, but would require regular thinning of all treated stands every decade or so because thinning tends to promote rapid growth of understory vegetation, making it a potential fuel ladder. Moreover, too much thinning can moderate stand climates, which may be favorable to some beetles, and increase wind speeds adding to crown fire spread." "Scientists, land managers and residents of Colorado are concerned about how wildfire might affect our forests and communities. If the goal is to protect communities, fire-mitigation efforts should be focused around those communities and homes, not in remote and ecologically valuable areas." "These forests may look different to us, but beetle-affected forests are still functioning ecosystems that provide food and shelter for animals, cool clear water for fish and humans, and irreplaceable refuges for wildlife from the effects of logging, road building and climate	The link provided for this article citation – NCCSP – does not contain the article and a search of the site did not provide any information. A general search found the report which discusses the possibility of exempting some roadless areas in Colorado from the 2001 Roadless Rule to “help mitigate the spread of ongoing insect outbreaks, reduce susceptibility to future outbreaks and reduce the risk of forest fires that is believed to increase due to insect infestations. “The main purpose of the 4FRI restoration treatments is not to control forest “pests”. Please see p 8-9 of the DEIS for the purpose and need for restoration and page 18 of the DEIS for the desired condition for forest insects and disease.
Artley, Dick	change." (Pp 23 and 24) "The definition of forest health is continually being reevaluated. For instance, where once forest fires and insect infestations were seen as indicators of unhealthy forests, and thus great effort was made to suppress them, forest landowners and managers today are appreciating the long-term contributions that these conditions can make to a healthy ecosystem. It may be said that the standards by which we measure forest health are determined by the objectives we aspire to. Forests managed for maximum timber yield will require different criteria for judging forest health than those managed for old-growth forest purposes. Likewise, the health of forests adjacent to or in urban communities will be judged with criteria that are quite different from those used to judge forests in rural areas where	The 4FRI DEIS (p8) states: “The purpose of the project is to re-establish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, fire, and climate change (FSM 2020.5).” Maximum timber yield is not a focus of this restoration project.
Artley, Dick	population densities are quite low." "Television commercials tell us that the only good bug is a dead bug.	Link is broken and a search on the California Forest Stewardship Program archived newsletter site did not find it. But the recognition of
Artley, Dick	But stop a moment and think about all the important jobs insects do:	

	they pollinate plants including trees, provide food for fish, birds, and other creatures, help decompose dead material, and make nutrients available to the forest. Insects keep our forests healthy."	the important role that insects provide can be found in the DEIS appendix 8 of the wildlife specialist's report. One of the goals of the 4FRI is to restore the ponderosa pine understory to benefit the arthropod community which includes the insects mentioned in this citation. Specifically it states: "Understory vegetation defines and supports the arthropod community. Arthropods, including insects, spiders, mites, centipedes, millipedes, isopods, and mollusks (snails and slugs), respond to changes in habitat structure (Pellmyer 1985, Buddle et al. 2006, Stephens Wagner 2006, Moisset and Buchmann. 2011). Arthropods are also key drivers of ecosystem structure and function. They decompose organic material, aerate and enrich soil, release nutrients back into the ecosystem, maintain genetic diversity within plant species, and serve as key prey for birds and small mammals which, in turn, support populations of larger predators (Meyer and Sisk 2001, Waltz and Covington. 2001, Samways 2005, Black 2005, Black et al. 2007, Capinera 2010, Mooney et al. 2010).
Artley, Dick	"On the basis of this review, we conclude that:" "The mountain pine beetle and other bark beetles are native species and natural and important agents of renewal and succession in interior forests. Beetle outbreaks create diversity in forest structure, tree ages and species composition at stand and landscape scales, which are important for forest ecosystem health, diversity, and productivity. Beetle-killed trees provide ecological services and functions well beyond their death. At the landscape scale, beetle infestations create a mosaic of forest patches of various ages, densities, species composition and successional stages." "The current outbreak in central BC is a socio-economic challenge, rather than an ecological crisis. Mountain pine beetle outbreaks, like fire, are a natural disturbance to which interior forests are adapted and with which these forests have evolved for millennia." "Management interventions have never before controlled a large outbreak." "Sanitation and salvage clearcutting differ from natural disturbances in their effect on forest structure, and tend to reduce stand and landscape diversity. Natural disturbances vary in their intensity, frequency and magnitude, and amount and type of forest structure they retain. A large-scale clearcut is a stand replacement event that differs from a natural disturbance, especially in its intensity (percent	Link is broken. Because this article addresses pine beetle management in British Columbia, Canada, and references "sanitation and salvage clearcutting," no effort was made to find the document as the information is not pertinent to the 4FRI restoration project. However, page 18 of the DEIS displays for the desired condition for forest insects and disease for the 4FRI. Analysis.

Artley, Dick	of woody structures removed), frequency over time, and magnitude. Structural diversity at both the stand and landscape level is important for maintaining biodiversity and for the ability of ecosystems to resist and recover from fires, diseases, and other disturbances. Reducing stand and landscape diversity through harvesting may increase the susceptibility of these forests to large mountain pine beetle outbreaks in the future." "Current mountain pine beetle management fails to adequately ensure that ecological values are protected. The current legal framework allows 'emergency' exemptions from block-size requirements, terrain stability assessments, adjacency constraints and public review periods for operational plans. 'Emergency' logging may also occur in Old Growth Management Areas, Wildlife Habitat Areas, riparian reserves, Wildlife Tree Patches, Forest Ecosystem Networks, ungulate winter ranges, thus affecting the implementation of higher level planning, e.g., Land and Resource Management Plans." "Insects are a part of the complex forest ecosystem. Like all parts of the ecosystem they have a role to play and they interact with many other components. This group of organisms is incredibly diverse and their ecosystem functions are equally diverse. The ecological role of insects ranges from benefactor to killer, with the beneficial insects being the most abundant. Pollination is an important role played by some insects. Wasps and bees pollinate flowering trees and shrubs. Speeding up decay is another insect function. Insects such as ants, termites and wood boring beetles bore into the wood of dead trees, speeding up the invasion of wood decaying microbes. Insects speed up nutrient cycling within the soil. Insects such as collembolans, thysanurans, beetles, and flies feed on organic matter and fungi, speeding the flow of nutrients to the soil. Other insects can act as predators and parasites of herbivorous insect pests. Under normal conditions these natural enemies control these pest populations. Insects also act as food sources for many insectivorous birds, amphibians and mammals. These multiple roles indicate the complexity of insect functions in the forest ecosystem. Insects are involved in the ecological processes of the forest, including in forest stability, succession and productivity. Over time, the insect populations of the host tree, attacking insects and insect enemies	Link is broken and a search for the article did not produce anything. Please see the response to #218-7 for the DEIS language recognizing the important role of insects in the ecosystem.

	fluctuate and end up regulating the composition and abundance of each. This impacts ecosystem stability. By feeding on unhealthy trees, insects help to re-cycle the nutrients from the dying trees to the healthy survivors. This maximizes the productivity of the average tree. The number of beneficial or non-harmful insect species in a forest is large. They play many essential roles within the forest ecosystem."	
Artley, Dick	"Scourge. Epidemic. Pest. All are words often used to describe the pine beetles currently wreaking havoc across large tracts of North America's forests. Yet nature is too complex for good-versus-evil characterizations, says Cameron Currie, an Edmonton-born scientist whose recent work has discovered a potential upside to the notorious bugs. While the pine beetle's power to destroy has been well-documented, it may also have the power to heal. Currie's research discovered the insect is associated with a bacterium containing an antibiotic compound that could eventually lead to new life-saving medicines." (Pg. 9)	Article is from the Edmonton Journal newspaper. Please see response to #218-9.
Artley, Dick	"Before discussing the above points in more detail, it is important to specify what the term health as applied to a forest ecosystem means to me; I believe my views reflect those of most ecological scientists. A healthy system is one that retains the integrity of its basic structure and processes, including viable populations of indigenous species. Some level of disease and tree death is normal and beneficial in forests; ecosystem health is not so much the absence of disease and death as it is the ability to contain these natural forces within certain bounds and the robustness to resist or recover quickly from environmental stresses. These system properties of "resistance" and "resilience" are closely associated in turn with species diversity and in particular with the multiplicity of interactions among species that compose the system. Although healthy trees are prerequisite to healthy forest ecosystems, health encompasses much more than trees, and forest health correlates much more closely with structure and processes than with how fast trees are growing."	Please see the response to #218-7.
Artley, Dick	"Research has already shown that insects are a key in cycling nutrients, speeding decomposition and building soil fertility. It now appears they do far more than that. It's becoming clear that major insect attacks are a powerful tool to shape the very species and	This link is broken but a search of OSU site found the article cited. http://oregonstate.edu/ua/ncs/archives/1997/may/insect-epidemics-natural-path-forest-health The article also states “[I]t's not really that simple, Schowalter said, and his research doesn't suggest we should just

	structure of forests into one that's appropriate for the terrain and climate - and one that's sustainable. In Oregon we've viewed the major insect epidemics simply as disasters. In fact, those destructive outbreaks are having an effect that's roughly comparable to fire. In some ways they're doing the forest underthinning that fire would have done and we should have done." Defoliating and sap-sucking insects affect nutrient turnover. Wood boring insects penetrate bark and provide access for decomposers and water, accelerating decomposition. Outbreaks can open holes in the forest canopy. The surviving trees get a nutrient burst to improve their growth and health. Something has to establish a balance between the available water, nutrients and the demands of plants. We finally came to realize that fire was a big part of that. Now we need to change our view of insects, because they too play a major role."	turn forest management over to the spruce budworm or bark beetles. For one thing, they've left behind a huge fuel load of dead trees that has really set the stage for catastrophic, stand-replacement fires." The 4FRI project "is expected to move almost 600,000 acres towards comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects" (DEIS p 8). Related to this goal is the objective of reducing the number of acres in the high bark beetle hazard rating; currently 71% of the analysis area falls into this category (DEIS p 18). The future desired condition includes a forest structure that allows bark beetles to function "at naturally occurring or historic levels" (DEIS p 18). This in turn will reduce the likelihood of stand-replacing fires.
Artley, Dick	"Native insects and diseases are intrinsic and necessary components of most terrestrial ecosystems. These and other natural disturbances, such as fire, are the drivers of forest diversity, structure, and function. Although at times devastating to the forest, they are necessary for the sustainability of forests (Aber and Melillo 1991, Attiwill 1994). Insects and diseases do cause economic harm. For the period 1982-1987, losses due to insects and diseases in Canada were estimated at over 100 million m3 annually or one third of the annual harvest (Hall and Moody 1994). Forest managers must balance volume loss without interfering with the necessary ecological functions that these agents provide to sustain a healthy forest."	The link to this article for the Canadian Forest Service does not work but a search turned up this site: http://www.nrcan.gc.ca/forests/insects-diseases/13361Although the forests in Canada are quite different from the ponderosa pine-dominated biome here in Southwestern USA, the challenges to resource managers are quite similar. Here is a quote from the website cited above: "The challenge for forest resource managers is therefore two-fold. First is to assess the risks posed by potential and actual outbreaks and spread. Second is to apply risk-based decision-making to manage forest ecosystems in a way that minimizes the negative impacts of outbreaks and maximizes the positive impacts."4FRI is meeting that challenge with the proposed restoration treatments. A main focus of the 4FRI project is to restore resiliency which "increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5)" (DEIS p8). This includes a desired condition for beetles to function at naturally occurring historic levels (DEIS, p 18).
Artley, Dick	"Although it may be relatively easy to ascertain whether an individual tree is healthy or not, the concept of "forest health" is very ambiguous. The presence of unhealthy trees does not necessarily imply that the forest as a whole is unhealthy. On the contrary, standing dead trees and fallen logs (coarse wood) play important roles in wildlife habitat, soil development, and nutrient cycling, and are a defining characteristic of old-growth forests. Bark beetle outbreaks rarely kill all of the trees in a stand, because they preferentially attack the larger trees and generally ignore the smaller trees. These smaller trees may be hidden by the red needles of the large killed trees during the peak of the outbreak, such that one often has an impression of total tree mortality. However, once those needles fall it usually becomes apparent that many small and moderate sized trees survived the outbreak. These smaller trees may grow two to four times more rapidly after the outbreak than they did	

	before, because they are no longer competing with the big trees for light, water, and nutrients (Romme et al. 1986). In mixed forests of lodgepole pine and aspen, the aspen may grow more vigorously after beetles kill the dominant pine trees. Even when all of the trees are killed, as in a severe forest fire, the result usually is stand regeneration, as described above for lodgepole pine. Thus, from a purely ecological standpoint, dead and dying trees do not necessarily represent poor "forest health." They may instead reflect a natural process of forest renewal." (pg.11)	
Artley, Dick	"Beyond that, these insect attacks are actually nature's mechanism to help restore forest health on a long-term basis and in many cases should be allowed to run their course, according to Oregon State University scientists in a new study published this week in the journal Conservation Biology in Practice. Native insects work to thin trees, control crowding, reduce stress and lessen competition for water and nutrients, the researchers found. Some levels of insect herbivory, or plant-eating, may even be good for trees and forests, and in the long run produce as much or more tree growth. 'There is now evidence that in many cases forests are more healthy after an insect outbreak,' said Tim Schowalter, an OSU professor of entomology. 'The traditional view still is that forest insects are destructive, but we need a revolution in this way of thinking. The fact is we will never resolve our problems with catastrophic fires or insect epidemics until we restore forest health, and in this battle insects may well be our ally, not our enemy.' "	This article, which quotes Tim Schowalter of Oregon State University, also claims "[B]ut the solution in cases such as this, Schowalter said, is to address the fundamental issue of overcrowding through forest thinning, controlled fire and insect attack, allowing the pine beetles to actually help in the long-term process of restoring forest health. "This statement partially reflects the purpose of the 4FRI restoration treatments. Please see p 8 of the DEIS for the purpose and need for restoring ponderosa pine forest health in AZ.
Artley, Dick	"Pine beetle suppression projects often fail because the basic underlying cause for the population outbreak has not changed (DeMars and Roettgering 1982). Typically, if a habitat favorable to high populations of western pine beetle persists, suppression-by whatever means-will probably fail. In summary, once bark beetles reach epidemic levels and cause extensive tree mortality, treatments aimed at reducing densities of the beetles are futile (Wood et al. 1985). Logging can also lead to heightened insect activity. Soil and roots can be compacted following logging, leading to greater water stress. Soil damage resulting from logging with heavy equipment can increase the susceptibility of future forests to insects and disease (Hagle and Schmitz 1993, Hughes and Drever 2001). Salvage logging after insect outbreaks also can make matters worse by removing snags, parasites, and predators from the forest system (Nebeker 1989). Outbreaks could then be prolonged because of a reduction in the effectiveness of natural enemies (Nebeker 1989). Standing dead	Please see the response for #218-1 and #218-4. The proposed treatments in the DEIS do not involve "sanitation" or "salvage logging.

Artley, Dick	trees are important for several birds that feed on mountain pine beetles; these birds are important regulators of endemic beetle populations that keep the risk of epidemics down (Steeger et al. 1998). Widespread removal of dead and dying trees eliminates the habitat required by bird species that feed on those insects attacking living trees, with the result that outbreaks of pests may increase in size or frequency (Torgerson et al. 1990). Logged stands have less diverse architecture and overall lower seed production than untouched stands. Consequently, logged stands have lower arthropod and small mammal diversity than undisturbed stands (Simard and Fryxell 2003). Mass annihilation of wood-decaying macrofungi and insect microhabitats from logging has an extremely detrimental effect on arthropod diversity (Komonen 2003), including on the natural enemies of pest insects. Sanitation and salvage logging differ from natural disturbance in their effects and tend to decrease habitat complexity and diversity, which can lead to an increase in insect activity (Hughes and Drever 2001). Large-scale efforts for beetle control are economically and ecologically expensive, and the uncertain benefits of control efforts should be weighed carefully against their costs (Hughes and Drever 2001). Former U.S. Forest Service Chief Jack Ward Thomas, in testimony before the U.S. Senate Subcommittee on Agricultural Research, Conservation, Forestry, and General Legislation on August 29, 1994, acknowledged that "the Forest Service logs in insect-infested stands not to protect the ecology of the area, but to remove trees before their timber commodity value is reduced by the insects." "These results indicate that widespread removal of dead trees may not effectively reduce higher-severity fire in southern California's conifer forests. We found that sample locations dominated by the largest size class of trees (>61 cm diameter at breast height (dbh)) burned at lower severities than locations dominated by trees 28-60 cm dbh. This result suggests that harvesting larger-sized trees for fire-severity reduction purposes is likely to be ineffective and possibly counter-productive." (Pg. 1) "We found that stands with recent high pre-fire tree mortality due to drought and insects did not burn at higher severity in coniferous forests of the San Bernardino Mountains, southern California, in the two fires we examined. Pollet	(218-7) The article discusses the role of dead trees on fire behavior. The excerpt discusses the removal of dead trees to change fire behavior. The 4FRI analysis is not proposing removing dead trees to change fire behavior. The methodology fire behavior modelling and analysis for the 4FRI DEIS is located in the fire ecology specialist report at pages 15-28.

	and Omi [32] reported anecdotally that stands of lodgepole pine (P. contorta) that experienced an insect epidemic in the 1940s in Yellowstone National Park burned at lower severities compared to adjacent burned areas in the 1994 Robinson Fire. A widespread low-severity fire in subalpine forests in the White River National Forest, Colorado did not burn any beetle-affected stands [13]. Further, Bebi et al. [12] found that stands of Engelmann spruce (Picea engelmannii) and subalpine fir (A. lasiocarpa) in the White River National Forest influenced by a spruce beetle outbreak in the 1940s did not show higher susceptibility to 303 subsequent forest fires that burned after 1950." (Pgs. 45 and 46)	
Artley, Dick	"A new study in the lodgepole pine forests of the greater Yellowstone region concludes that rather than increasing the wildfire risk, beetle attacks reduce it by thinning tree crowns." "The researchers used satellite imagery to map lodgepole stands attacked by mountain pine beetles, a type of bark beetle, then hiked into the areas to confirm the beetle damage and measure fuel loads. Then they ran computer models to predict fire behavior."	This is a newspaper article about lodge-pole pine forests and wildfire risk in Yellowstone NP. The researcher quoted in the article also states: "[T]he research on beetles and wildfire has focused on lodge pole and spruce-fir stands, so scientists can't say whether the results apply to other forest types that have also experienced beetle damage." The 4FRI DEIS is not within this forest type, so the conclusions from this article cannot be applied due to the lack of application to other forest types stated in the article.
Artley, Dick	"The primary driver of fire is not beetle kill. It's climate," said Barry Noon, a wildlife ecology professor at Colorado State University and an author of the report. "It's drought and temperature." The report warns against using tax dollars to fund widespread forest-thinning efforts, particularly in roadless areas that have been off-limits to logging. Instead, the authors encourage efforts to be focused around the edges of communities. "We're certainly not arguing against cutting down some of these trees, but we think that the cutting effort needs to be focused around communities and homes," Noon said. "It makes little sense to have wide-scale cutting of these trees." "	This is a blog article that references a report cited earlier (#218-5). Please see the response given for #218-5 and #218-1.
Artley, Dick	"Although the scale of the recent beetle outbreak is unprecedented in modern times, experts note that insect outbreaks and fires are a natural part of Western forest ecosystems. As such, the report found no causal link between insect outbreaks and the incidence of wildfire. Moreover, the authors found that tree cutting "is not likely to control ongoing bark beetle outbreaks," nor will it be "likely to alleviate future large-scale epidemics." "Despite nearly 100 years of	The 4FRI is not industrial logging and the main purpose is not to control forest "pests". Please see response #218-1.

	active forest management to control the mountain pine beetle, there is very little evidence to suggest that logging is effective, especially once a large-scale insect infestation has started," Black said. Black noted that even logging dead trees could make things worse from an ecological standpoint, since their removal eliminates habitat for parasites and insect predators. Logging can also seriously damage soil and roots, leading to greater stress on remaining trees and increasing their susceptibility to outbreaks."	
Artley, Dick	"Although ongoing outbreaks understandably have led to widespread public concern about increased fire risk, the best available science indicates that outbreaks of mountain pine beetle and spruce beetle do not lead to an increased risk of fire in the vast majority of forests that are currently being affected. We should not let the effects of bark beetle outbreaks, as spectacular as they may be, distract us from the real risk. The real concern in that we have built homes, communities, ski resorts, and other infrastructure in inherently flammable ecosystems. The ongoing outbreaks have not increased the risk of wildfire as much as they have drawn attention to the risk that has been there long before the outbreaks began. Forests of lodgepole pine and spruce-fir are prone to high-severity fires during drought conditions, regardless of the influence of bark beetle outbreaks." (Pg. 5)	Link is broken but was found here:http://www.clarku.edu/departments/geography/documents/KulakowskiTestimonyApril20112013.pdfThe citation used refers to lodgepole pine which requires stand replacement disturbances such as high-severity fire for regeneration so it is not relevant for the 4FRI ponderosa pine biome. The fire regime and fire return interval and stand structure for ponderosa pine are disclosed in the fire ecology and silviculture sections in Chapter 3 of the DEIS and their respective specialist reports.
Artley, Dick	"The mountain pine beetle is a native insect, having co-evolved as an important ecological component of western pine forests. The inter-relationship between beetle-caused mortality and subsequent fire has resulted in a basic ecological cycle for many western forests (Schmidt 1988). Some pines species, such as lodgepole pine, are maintained by periodic disturbances. The lodgepole pine forest-type1 typically is an essential monoculture of even-aged trees that were initiated by a catastrophic, stand-replacing fire. Without the influence of fire (Fig. 1B), lodgepole pine would be lost over much of its native range (Brown 1975, Lotan et al. 1985). Fire serves to prepare the seedbed, releases seeds from the serotinous cones (triggered to release seeds by heat of a fire), and eliminates more shade-tolerant species such as spruce or fir that would eventually out-compete and replace the early seral lodgepole pine."	Link is broken. Here is correct link:http://www.entsoc.org/PDF/Pubs/Periodicals/AE/AE-2001/fall/feature-logan.pdfPlease see response to #218-21.
Artley, Dick	"The sheer number of diverse opinions about how the mountain pine	This is an opinion piece in a Wyoming newspaper concerning the

	beetle epidemic will ultimately impact Wyoming's ecosystem suggests that there's no single strategy the state should employ in its forests at this time. There are simply too many unknowns, so scientists, conservationists and state officials are better off adopting a "wait and see" attitude than taking action now they might regret in the future." "But it's clear that Wyoming would be best served if all parties view the beetle epidemic as a scientific issue and not a political one. Political solutions can be expedient, but in hindsight often prove to be costly mistakes." "Some observers worry that the dead trees will create a significantly higher fire danger. Others suggest that the fire danger has been exaggerated. A study of lodgepole pines in the greater Yellowstone region, for example, concluded that beetles actually reduce the risk of wildfires by thinning tree crowns. Some experts note that wildfires are just as likely to erupt in green, healthy forests as they are in beetle-killed forests." "But what should be done with the trees killed by beetles? Logging is one potential answer. The U.S. Forest Service, using a $40 million grant to clear beetle-killed trees, recently announced plans to cut about 14,000 acres of trees near communities and in more than 350 recreation sites in Wyoming and Colorado. Skeptical environmental groups, however, argue forestry officials are simply using the beetle epidemic as an excuse to do more logging on protected land." "Wyoming can't afford to let those fears result in wasting millions of state and federal dollars fighting the epidemic and letting industry rush to chop down dead trees. Wyoming's best chance to make wise, informed decisions is to follow the science, and be willing to be nimble as data and test results change."	logging of beetle-killed trees. Please see DEIS p 8 for the purpose and need for the 4FRI restoration project, and p18 of the DEIS for specific information on management of bark beetles.
Artley, Dick	"The idea that beetle damaged trees increase fire risks seems a logical assumption - dead trees appear dry and flammable, whereas green foliage looks more moist and less likely to catch fire. But do pine beetles really increase the risk of fire in lodgepole pine forest? University of Wisconsin forest ecologists Monica Turner and Phil Townsend, in collaboration with Renkin, are studying the connection in the forests near Yellowstone National Park. Their work -- and their surprising preliminary results -- are the subject of the NASA video." Link to the video: http://svs.gsfc.nasa.gov/vis/a010000/a010600/a010634/G2009-	Broken link; here is the current, correct one:http://landsat.gsfc.nasa.gov/?p=616 The research mentioned in this article refers to lodge pole pine forests which are dissimilar to our Southwestern ponderosa pine forests. The main goal of the 4FRI is not to manage forest “pests”; future desired condition “includes a forest structure that allows bark beetles to function at naturally occurring or historic levels” (DEIS p 18).

	098_Wildfire_and_Beetles__ipod_lg.m4v "Their preliminary analysis indicates that large fires do not appear to occur more often or with greater severity in forest tracts with beetle damage. In fact, in some cases, beetle-killed forest swaths may actually be less likely to burn. What they're discovering is in line with previous research on the subject." "The results may seem at first counterintuitive, but make sense when considered more carefully. First, while green needles on trees appear to be more lush and harder to burn, they contain high levels very flammable volatile oils. When the needles die, those flammable oils begin to break down. As a result, depending on the weather conditions, dead needles may not be more likely to catch and sustain a fire than live needles." "Second, when beetles kill a lodgepole pine tree, the needles begin to fall off and decompose on the forest floor relatively quickly. In a sense, the beetles are thinning the forest, and the naked trees left behind are essentially akin to large fire logs. However, just as you can't start a fire in a fireplace with just large logs and no kindling, wildfires are less likely to ignite and carry in a forest of dead tree trunks and low needle litter. " "MANAGEMENT IMPLICATIONS (1) Our findings suggest that mountain pine beetle infestation in lodge pole pine does not increase the subsequent risk of active crown fire, and that fire does not necessarily cause an epidemic of mountain pine beetle in nearby lodge pole pine." (Pg. 37) "(3) Even within high-severity bark beetle infestations, all lodge pole pine trees were not killed. These forests generally remain well stocked, with density of young trees sufficient to replace individuals lost during the current epidemic." (Pg. 38) "(5) Our findings support the need for forest managers to take a long-term and broad-scale view of timber and disturbance dynamics." (Pg. 38) "(6) Because climate drivers are so important for both fire and insect disturbances, forest managers may be very limited in their	Please see the response to #218-21 as this research is focused on lodge pole pine forests and high-severity fire in the Greater Yellowstone Area and is not relevant to the 4FRI project area. There are no proposals within the 4FRI DEIS to remove dead trees to reduce fire hazards (see Chapter 2 -Alternatives).
Artley, Dick	ability to change or stop these disturbances." (Pg. 39) "The current pine beetle "outbreak" that has led to tree mortality among Rocky Mountain forests has prompted some people to suggest that beetles are "destroying" our forests and that beetle-killed trees will invariably lead to larger wildfires. At the heart of this issue are flawed assumptions about wildfires, what constitutes a	This is opinion piece in a newspaper. Please see the response to #218-9 for more information on how the 4FRI specialists view the role of insects such as the bark beetle; to response #218-1 for definition of forest health; to response #218-14 for the intent to reduce the
Artley, Dick	healthy forest and the options available to humans in face of natural	percentage of acres currently in the high bark-beetle severity category.

	processes that are inconvenient and get in the way of our designs. While it may seem intuitive that dead trees will lead to more fires, there is little scientific evidence to support the contention that beetle-killed trees substantially increase risk of large blazes. In fact, there is evidence to suggest otherwise."	
Artley, Dick	"Recently burned areas represent an important type of habitat that many species of animals have evolved to utilize. Snags (standing dead trees) provide critical nesting and foraging habitat for birds and small mammals, and as they decay and fall, create additional habitat for small mammals and terrestrial amphibians as coarse woody debris."	http://terraweb.forestry.oregonstate.edu/biscuit.htmThe link to the article about the Biscuit fire in OR is broken, but further searching found the correct link above. This article is mainly focused on post-wildfire salvage logging and the quote is about the importance of snags for wildlife habitat. Snags are mentioned in the DEIS on the following pages:180, 184, 187, 191,197, 200, 202, 208, 209, 210, 224, 225, 228, 232, 233, 235, 237-240, 242, 244, 344, 353, 447, 448, 451, 461, 462, 476-478, 487, 488, 489, 491, 505, 509, 522-524, 538-540, 552, 553, 556, 582, 591, 595-598, 610-618, 620, 623, 625, 627, 631,633, 636-640, 647, 664, 677, 681, and 710.The 4FRI environmental analysis concurs with this statement concerning importance of snags, and states it will “retain key habitat components such as snags and large downed logs” (4FRI DEIS p 505).
Artley, Dick	"Yellowstone is a 'fire-adapted ecosystem,' which means wildfire helps maintain the health of the area's wildlife and vegetation. Most park fires are caused by lightning and, whenever possible, monitored and managed, but not necessarily extinguished."	The new article is in reference to Yellowstone National Park, a completely different fire regime and ecosystem than the 4FRI analysis area. Please refer to the DEIS for more information on fire ecology in the 4FRI analysis area starting on page 149. Additional information may be found in the Fire Ecology / Air Quality Report. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Finally, as mentioned above, wildfires can also generate benefits. Many plants regrow quickly following wildfires, because fire converts organic matter to available mineral nutrients. Some plant species, such as aspen and especially many native perennial grasses, also regrow from root systems that are rarely damaged by wildfire. Other plant species, such as lodge pole pine and jack pine, have evolved to depend on stand replacement fires for their regeneration; fire is required to open their cones and spread their seeds. One author identified research reporting various significant ecosystems threatened by fire exclusion - including aspen, whitebark pine, and Ponderosa pine (western montane ecosystems), longleaf pine, pitch pine, and oak savannah (southern and eastern ecosystems), and the tallgrass prairie. [57] Other researchers found that, of the 146 rare,	There is no conflict between this statement and the 4FRI DEIS. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is “to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity…improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects.” On page 24 we recognize the specific role of fire that the desired condition is to have fire maintain a mosaic of diverse native plant communities. Chapter 3 within the DEIS discloses the effects of proposed fire treatments within the landscape for all resources.

	threatened, or endangered plants in the coterminous 48 states for which there is conclusive information on fire effects, 135 species (92%) benefit from fire or are found in fire-adapted ecosystems." [58] "Animals, as well as plants, can benefit from fire. Some individual animals may be killed, especially by catastrophic fires, but populations and communities are rarely threatened. Many species are attracted to burned areas following fires - some even during or immediately after the fire. Species can be attracted by the newly available minerals or the reduced vegetation allowing them to see and catch prey. Others are attracted in the weeks to months (even a few years) following, to the new plant growth (including fresh and available seeds and berries), for insects and other prey, or for habitat (e.g., snags for woodpeckers and other cavity nesters). A few may be highly dependent on fire; the endangered Kirtland's warbler, for example, only nests under young jack pine that was regenerated by fire, because only fire-regenerated jack pine stands are dense enough to protect the nestlings from predators." "Forested landscapes may be thought of as living "crazy quilts," with patches formed occasionally through the action of natural and human-caused disturbances like fire, windstorms, and logging. Prior to the advent of modern logging technology, virtually every North American forest experienced occasional renewal through the action of fire. In some places, fire was a frequent visitor, killing very few large trees as it burned harmlessly through the forest litter and grass. In most places, though, fire burned only occasionally, creating patches of severely burned forest as it raced through the canopy under extreme weather conditions. In these patches, old forests were killed, soon to be replaced by young, rejuvenated stands. This cycle of forest maturation, death, and replacement was critical to	
Artley, Dick	maintaining the diversity and vitality of the ecosystem."	Please see response to #219-3.
Artley, Dick	"Trees killed by wildfire and left standing take on roles that change the ecological services they previously provided as components of a green-tree system. They still offer some shade, which in a burned environment can slow the heating of surface waters and the soil surface. They may also provide more rapid recruitment of large wood into streams. Decomposing fallen trees provide nutrients, shelter, and early structure for a rejuvenating forest floor." "Burned forests	The article discusses post-fire logging (salvage) effects. Salvage logging is out of the scope of this project. See response to #219-1.

	typically support significantly different bird communities, with many species dependent on stand-replacement fires to maintain their populations across the landscape. Usually there's an increase in cavity-nesting, insectivorous birds such as woodpeckers and certain species of flycatchers." "Since those early days, millions of dollars have been spent on campaigns to prevent forest fires. But researchers now know that fire is not necessarily bad. It can be a natural part of a healthy grassland or forest ecosystem. Fire reduces the buildup of dead and decaying leaves, logs and needles that accumulate on the forest floor. It reduces or eliminates the overhead forest canopy, increasing the sunlight that stimulates new growth from seeds and roots. Many plants and animals have adapted to fire. Both lodge pole pine and jack pine have resin-sealed cones that stay on trees for many years. The heat of fire melts the resin and the cones pop open. Thousands of seeds then scatter to the ground and grow into new stands of pine. Woodpeckers feast on bark beetles and other insects that colonize in newly burned trees. And so, 20 years ago, Parks Canada decided that it wouldn't interfere in natural processes such as fire, insects and disease unless it had to - that is, unless people or	
Artley, Dick	neighbouring lands were threatened."	Thank you for this Canadian news channel report on the benefits of restoring the natural fire regime to their forested lands (which are very different ecosystem than southwestern ponderosa pine). The 4FRI project summary (p iii of the DEIS) states: “The purpose of the project is to re-establish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5).” This article also states in the summary, “These realities have brought about a greater sense of the importance of understanding how forests should be managed to ensure health and sustainability. Current practices use a combination of containment measures in an attempt to balance the importance of periodic fires to ecosystem health and the danger of uncontrolled burns to human communities.” From page 9 of the DEIS, the purpose of the 4FRI is “to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5)”, which concurs with this statement. Please see response to #218-4. Also, the 4FRI analysis is not proposing logging fire burned trees, so the discussion is not germane to the analysis in the DEIS.
Artley, Dick	"Wildfires are a natural occurrence and serve important ecosystem functions. Forest landscapes are dynamic and change in response to variations in climate and to disturbances from natural sources, such as fires caused by lightning strikes. Many tree species have evolved to take advantage of fire, and periodic burns can contribute to overall forest health. Fires typically move through burning lower branches and clearing dead wood from the forest floor which kick-starts regeneration by providing ideal growing conditions. It also improves floor habitat for many species that prefer relatively open spaces."	
Artley, Dick	"Animals, as well as plants, can benefit from fire. Some individual animals may be killed, especially by catastrophic fires, but populations and communities are rarely threatened. Many species	

	are attracted to burned areas following fires - some even during or immediately after the fire. Species can be attracted by the newly available minerals or the reduced vegetation allowing them to see and catch prey. Others are attracted in the weeks to months (even a few years) following, to the new plant growth (including fresh and available seeds and berries), for insects and other prey, or for habitat (e.g., snags for woodpeckers and other cavity nesters). A few may be highly dependent on fire; the endangered Kirtland's warbler, for example, only nests under young jack pine that was regenerated by fire, because only fire-regenerated jack pine stands are dense enough to protect the nestlings from predators. In summary, many of the ecological benefits of wildfire that have become more widely recognized over the past 30 years are generally associated with light surface fires in frequent-fire ecosystems. This is clearly one of the justifications given for fuel treatments. Damage is likely to be greater from stand replacement fires, especially in frequent-fire ecosystems, but even crown fires produce benefits in some situations (e.g., for the jack pine regeneration needed for successful Kirtland's warbler nesting)."	
	"Natural forest disturbances, including fire, kill trees but remove very little of the total organic matter. Combustion rarely consumes more than 10 to 15 percent of the organic matter, even in stand-replacement fires, and often much less. Consequently, much of the forest remains in the form of live trees, standing dead trees, and logs on the ground. Also, many plants and animals typically survive such disturbances. This includes living trees, individually and in patches."	
Artley, Dick	"These surviving elements are biological legacies passed from the pre-disturbance ecosystem to the regenerating ecosystem that comes after. Biological legacies are crucial for ecological recovery. They may serve as lifeboats for many species, provide seed and other inocula, and enrich the structure of the regenerated forest. Large old trees, snags, and logs are critical wildlife habitat and, once removed, take a very long time to replace."	http://www.issues.org/20.1/franklin.htmlOriginal link provided was broken but the correct link was found and is shown above. This 2003 article concerns national fire management policy and changes to it are not within the scope of the 4FRI project. See the response to #219-1 for more information on how the 4FRI is managing for snags. Also, the 4FRI analysis is not proposing logging fire burned trees, so the discussion is not germane to the analysis in the DEIS.
Artley, Dick	"Research had documented that, in some situations, wildfires brought ecological benefits to the burned areas - aiding regeneration of native flora, improving the habitat of native fauna, and reducing infestations of pests and of exotic and invasive species." (pg 2)	For information about what the 4FRI DEIS says about the role of fire, please see response #219-3.Additional information may be found in the Fire Ecology/Air Quality Report. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home

Artley, Dick	"Ecologists and fire experts unanimously agree that fire has served an essential role in certain ecosystems for millennia. The ecological benefits of fire include: the creation of critical wildlife habitat in standing dead trees, increased nutrients and productivity in soil systems when burned material decomposes, improved conditions for surviving old growth trees when a surface fire moves through a system, and the regeneration of some fire dependent trees like lodge pole pine (Pinus contorta). Fire also increases availability of other fundamental building blocks of ecosystems such as moisture and sunshine by opening up the canopy and returning nutrients to the soil. Natural fire cycles maintain the diversity of habitats available to all the species in the ecosystem, from wildlife to wildflowers to fungi."	The 4FRI project analysis and conclusions in the DEIS are in concurrence with this statement. Additional information may be found in the wildlife, Fire Ecology / Air Quality Reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"We do not need to be afraid of the effects of wildland fire in our forests. Fire is doing important and beneficial ecological work," said the report's author, Dr. Chad Hanson, a forest and fire ecologist and Director of the John Muir Project. "It may seem counterintuitive, but the scientific evidence is telling us that some of the very best and richest wildlife habitat in western U.S. forests occurs where fire kills most or all of the trees. These areas are relatively rare on the landscape, and the many wildlife species that depend upon the habitat created by high-intensity fire are threatened by fire suppression and post-fire logging."	Information on the Fire Ecology of the project area and the Wildlife analysis may be found in the Fire Ecology/Air Quality and Wildlife reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home. Also, the 4FRI analysis is not proposing logging fire burned trees, so the discussion on salvage logging is not germane to the analysis in the DEIS.
Artley, Dick	"As summer wildfire season begins in earnest throughout much of the West, it's important for the public and policymakers to recognize the important role that severely burned forests play in maintaining wildlife populations and healthy forests. Severely burned forests are neither "destroyed" nor "lifeless." From my perspective as an ecologist, I have become aware of one of nature's best-kept secrets - there are some plant and animal species that one is hard-pressed to see anywhere outside a severely burned forest." "An appreciation of the biological uniqueness of severely burned forests is important because if we value and want to maintain the full variety of organisms with which we share this Earth, we must begin to recognize the healthy nature of severely burned forests. We must also begin to recognize that those are the very forests targeted for postfire logging activity. Unfortunately, postfire logging removes the	Please see response #219-3.Also, the 4FRI analysis is not proposing logging fire burned trees, so the discussion on salvage logging is not germane to the analysis in the DEIS.

Artley, Dick	very element - dense stands of dead trees - upon which many fire-dependent species depend for nest sites and food resources." "Trees in a burned landscape, both dead and alive, continue to provide homes for wildlife after a fire and form the building blocks of new forests."	The DEIS supports the statement that fire does important and beneficial ecological work. Please see the response to #219-4.
Artley, Dick	"For Pyne and many others who study wildfires, the conventional understanding of firefighting has led us to the misguided conclusion that this is a struggle we can win. In much of the West, fire is an ordinary part of the landscape, a feature as essential to many ecosystems as rivers and grasses. Periodic fires are nothing more than regular disturbances; it is us who have made them into disasters."	We agree, one of the desired conditions for the project is to have fire maintain a mosaic of diverse native plant communities (DEIS, p24).
Artley, Dick	"Fire releases nutrients and uncovers bare soil. The blackened, bare soil warms quickly, which stimulates soil microbial activity, nutrient cycling, and plant growth. In forests, fire opens up part of the canopy to sunlight, which allows sun-loving plant species to recolonize the site." "Following fires, plant communities go through successional changes. Many native wildlife species and popular game species, such as bobwhite quail, white-tailed deer, and wild turkey, are dependent on periodic fire to create and maintain suitable habitat. Surface fires can stimulate the growth of herbaceous foods for deer, elk, moose, and hares, and can enhance berry production for black bears and other wildlife. Small mammal populations generally increase in response to new vegetation growth, providing a food source for carnivores. Fire can also reduce internal and external parasites on wildlife." (pg. 2) "natural disturbance such as fires, floods, and herbivory are critical in maintaining valuable ecosystem functions and creating and restoring wildlife habitat." (pg. 7)	Please see response to #219-3.
Artley, Dick	"During recent decades, ecologists have learned that forest fires were a pervasive phenomenon in practically all forests of the world, even the rainforests. Humans have severely disrupted the natural pattern of fire across the landscape, especially during the last 100 years. Therefore, if forests are to be returned to their more 'natural' state, fire will have to be reintroduced."	The fire ecology report supports this finding as restoring the natural fire regime for the ponderosa pine ecosystem in the analysis area is a major focus. Please see the response to #219-3 for more information about what the DEIS says about the role of fire.
Artley, Dick	Contrary to what you may think, a forest fire does not reduce everything to a lifeless ash. Instead, it leaves behind a landscape of blackened trees interspersed with remnants of green, intact forest.	See the response to #219-1 for more information on how the 4FRI is managing for snags. Information on the 4FRI analysis may be found in the Fire Ecology/Air Quality and Wildlife reports. Both are available on

	Post-fire specialists such as wood-boring insects quickly colonize the dead trees (snags), attracting an array of woodpeckers." "Identifying the ecological value of a post-fire structure and the characteristics that make it attractive to wildlife is important."	the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Trees that survive the fire for even a short period of time are critical as seed sources and as habitat that will sustain many elements of biodiversity both above and below ground. The dead wood, including large snags and logs, is second only to live trees in overall ecological importance."	Please see the response to #219-18.
Artley, Dick	"Disturbances, from windthrown trees to fires, are natural in forests and are essential for forest ecosystem well being. For example, fire is a disturbance in forests, but it is also beneficial. While disturbances kill some individuals, they also open up ecological living space for recolonization by many previously excluded species." "Without fire, natural succession is upset. In a forest where fire has been unnaturally suppressed for many years (50 or more), fire intolerant trees grow unchecked, suppressing and outcompeting the normally dominant fire resistant trees. Overall biodiversity is reduced. As the tree diversity declines, the habitat becomes unsuitable for a large portion of the forest species. Animal species are lost, since the animals use the fire tolerant variety of tree species for food, shelter and nest sites."	Please see the response to #219-11.
Artley, Dick	"As a rule of thumb, timber experts say that any particular chunk of ground in the forest should be touched by intense fire every 50 to 100 years. But the power of the fire is just the first step in forest regrowth. Weather patterns in the affected area over the nest year will play a big role in how the new forests develop. A summer of drought could kill the newly released seeds and short-circuit any new growth. That could give new species of trees a chance to grow in the area. Normal rains mixed with the nutrients left on the ground from the fire could be a great booster shot to getting the seeds off to a flying start. Other natural benefits can be seen from fires. For instance, the once-rare black-backed woodpecker is now a regular site in the BWCA with the abundance of dead trees from recent smaller fires and the 1999 wind blow down of trees. New shrubs and ground vegetation is appealing to different kinds of wildlife to snack on."	The author neglected to be species specific with the discussion of fire intensity, and all conifer forests are not the same. The use of the phrase, “as a rule of thumb…” oversimplifies the ecological intricacies and influences of historic fire regimes. We concur that fire plays a beneficial role in southwestern ponderosa pine ecosystems and as such display the desired condition for fire for the 4FRI project on p 24 of the DEIS. The fire ecologist section of the DEIS, as well as the fire ecologist specialist report disclose the role of fire in the 4FRI landscape.

Artley, Dick	"Rotting logs are a very common feature of wild ecosystems. Rotting logs recycles nutrients back into the soil and provides a healthy habitat for a wide range of insects, plants, and animals. Rotting log provides homes for small mammals, insects, worms, and spiders. The rich, organic soil provides a unique habitat for fungi, tree seedlings, wildflowers, mosses, and ferns."	We agree that logs and other coarse woody debris (CWD) are important components of a healthy forest environment. The DEIS discusses the management of CWD on pages 13 – 14 (Habitat component); 24 (relation to fire severity); 106 and 109 (soil health); 127-128, 219 (Goshawk habitat); 134-138, 180, 183, 189, 191, (MSO habitat); 149, 157, 160, 161 (fire effects); 166 (air quality); 582, 588, 595, 598 (BMPs / mitigation); 611, 613-615, 617, 620 - 621, 623, 625, 627, 628, 631, 633, 636 – 640 (Implementation Plan).CWD is also discussed in the specialists reports on Soil/Water, Wildlife, Silviculture, and Fire Ecology. The DEIS and all these reports are available on the web at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"More and more woodlot owners are taking a broader view of their forests. They look for values other than the immediate return on wood harvested. These values include other forest products such as ground hemlock and mushrooms; carbon storage; water purification; leaving a legacy for their children; and healthy wildlife populations. Wildlife trees (dead or dying trees used for nesting, feeding, denning and roosting) go through several stages that can start with ants tunneling into the rotting centre to flycatchers perching on the bare branches. For cavity-nesting birds they are critical habitat. Some species excavate cavities for their nests, while others take over and enlarge existing holes. Many of these birds in turn help the forest, eating insects which can damage trees."	See Appendix 8 in the Wildlife specialists report for details on how treatments might affect habitat for various species, including ants and birds. See responses to #219-24 (CWD) and #219-1 (snags).The DEIS and specialists reports (including Wildlife and Soil/Water) are available on the web at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Species that breed exclusively in the first 30 years after fire may be difficult to maintain in the ecosystem without fire. Fire exclusion and post-fire salvage of dead trees after fire may reduce populations of these species over large geographic areas."	Salvage logging is out of the scope of this project and is not considered in any alternatives within the DEIS (DEIS, chapter 2) For information about what the 4FRI DEIS says about the role of fire, please see response #219-3 and #219-11. The DEIS and specialists reports (including Wildlife) are available on the web at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Ecological benefits of fire: * Promotes flowering of herbaceous species and fruit production of woody species. * Improves nutritional quality of plants for both wild and domestic animals. * Enhances nutrient cycling of some elements and elevates soil pH. * Maintains required habitat conditions for fire-adapted plant and animal species. * Results in a more heterogenous and diverse habitat--if natural fires are patchy--leaving pockets of unburned areas. * Prohibits wildfire conditions from developing (i.e., vast	For information about what the 4FRI DEIS says about the role of fire, please see response #219-3 and #219-11.

	accumulation of highly-flammable, dead vegetation.)"	
Artley, Dick	"In retrospect, it is amazing that forest managers did not realize that dead wood was a critical habitat component for vertebrate and invertebrate wildlife and for the forest itself."	We concur with this statement that dead woody material (course woody debris in the DEIS---the definition is in the glossary on page 342 of the DEIS). Course woody debris are desired conditions for wildlife are displayed on page 13 and 14 of the DEIS. Course woody debris is also a prescribed as a design feature to maintain long-term soil productivity (DEIS, p 582 and 598) and for wildlife habitat (DEIS page 595 and 598). Further guidance for management of course wood debris is located in the implementation plan (Appendix D) of the DEIS. The effects of proposed management actions on course woody debris are disclosed on pages 106, 109, 120, 134-38, 149, 155, 157, 165-66, 180, 183, 189, 191, 219 and 250 of the DEIS.
Artley, Dick	"Wildfires have been a natural part of our environment since time began. Under the right circumstances these wildfires can be beneficial to an ecosystem." "Wildfires consume vegetation that would otherwise become overgrown, creating ideal conditions for a catastrophic wildfire. Wildfires allow more open spaces for new and different kinds of vegetation to grow and receive sunlight. This, in turn, provides fresh nutrients and shelter for forest plants and animals. Wildfires also keep our forests healthy by consuming harmful insects and diseases."	The 4FRI project analysis and conclusions in the DEIS are in concurrence with this statement. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is "to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity…improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects". On page 24 of the DEIS we recognize the specific role of fire that the desired condition is to have fire maintain a mosaic of diverse native plant communities. Chapter 3 within the DEIS discloses the effects of proposed fire treatments within the landscape for all resources. Additional information may be found in the wildlife, Fire Ecology / Air Quality Reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Fire is an essential, natural and necessary part of Western forest ecology. Many species of trees can only reproduce after fires occur. Wildland fires burn underbrush and return important nutrients to the soil."	The 4FRI project analysis and conclusions in the DEIS are in concurrence with this statement. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is "to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity…improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects". On page 24 of the DEIS we recognize the specific role of fire that the desired condition is to have fire maintain a mosaic of diverse native plant communities. Chapter 3 within the DEIS discloses the effects of proposed fire treatments within the landscape for all

		resources. Additional information may be found in the wildlife, Fire Ecology / Air Quality Reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Wildfire is a natural part of most ecosystems across British Columbia. It helps to renew the forest, maintain the diversity of plant and animal life, and keep insects and disease in check. It opens up dense forest to allow the growth of shrubs and grasses, creating browse for deer, moose, elk and other animals. It releases nutrients locked in slowly decaying logs."	The article discusses fire in British Columbia, but fire is a key natural process within the 4FRI landscape as well. The 4FRI project analysis and conclusions in the DEIS are in concurrence with this statement. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is "to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity…improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects". On page 24 of the DEIS we recognize the specific role of fire that the desired condition is to have fire maintain a mosaic of diverse native plant communities. Chapter 3 within the DEIS discloses the effects of proposed fire treatments within the landscape for all resources. Additional information may be found in the wildlife, Fire Ecology / Air Quality Reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"People are bombarded with the negative aspects of fire," Paragi said. "You hear terms like 'destroyed thousands of acres of forest,' and the thought of destruction gets embedded in the public mind. But fire is a natural part of the ecosystem and it is actually very important." " "Fire opens up the forest canopy and allows sunlight to reach the ground, stimulating the organisms that decompose organic matter and make nutrients available to plants. Fire burns off the insulating layer of moss and duff, allowing sunlight to further warm the soil. The ash can release nutrients back into the soil and change soil chemistry, promoting plants growth."	The 4FRI project analysis and conclusions in the DEIS are in concurrence with this statement. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is "to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity…improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects". On page 24 of the DEIS we recognize the specific role of fire that the desired condition is to have fire maintain a mosaic of diverse native plant communities. Chapter 3 within the DEIS discloses the effects of proposed fire treatments within the landscape for all resources. Additional information may be found in the wildlife, Fire Ecology / Air Quality Reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Healthy ecosystems burn, and often burn by the tens of millions of acres. The spate of large wildfires we are experiencing now are not "abnormal" or an indication of "unhealthy" forest. Rather, we are seeing the natural response of a healthy forest ecosystem. Given	The 4FRI project analysis and conclusions in the DEIS are in concurrence with this statement. The purpose and need of the 4FRI is discussed and described on pages 1 – 40 of the DEIS. Specifically, the purpose and need of the 4FRI is "to reestablish and restore forest structure and

	that wildfire was so common for thousands of years, it is not surprising that recent research shows that wildfires, particularly severe wildfires, increase biodiversity. If anything, we probably need more wildfire, not less. With global warming we will probably get it, as vegetative communities adapt to new climatic realities."	pattern, forest health, and vegetation composition and diversity…improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects". On page 24 of the DEIS we recognize the specific role of fire that the desired condition is to have fire maintain a mosaic of diverse native plant communities. Chapter 3 within the DEIS discloses the effects of proposed fire treatments within the landscape for all resources. Additional information may be found in the wildlife, Fire Ecology / Air Quality Reports. Both are available on the 4FRI website at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	The following document contains pertinent color pictures showing logging damage, thus the article text is not shown here. Please use the link below to access the article.	This is an unpublished paper that discusses the effects of habitat fragmentation. The 4FRI project does not have any prescription that proposes clearcuts. The DEIS discuss habitat connectivity for wildlife species on page 174 and on page 40 of the wildlife specialist report. The complete analysis for bridge habitat for canopy-dependent wildlife can be found in appendix G of the DEIS and appendix 3 of the wildlife report. The terrestrial wildlife specialist report discloses habitat fragmentation for wildlife species in several areas: page 120 for four spotted skippling; page 144, 585 and 592 for pronghorn; page 176 discusses climate change and habitat fragmentation; page 194 for the Mexican spotted owl; page 375 for nitocris fritillary; page 380 for Navajo Mogollon vole; page 385 for long-tailed vole; page 386 for the dwarf shrew; page 388 for the Merriam's shrew; page 521-523, 634, and 674 for effects to understory species. Habitat effects could be similar to those that would occur with severe wildfire and could ultimately lead to habitat fragmentation or vegetation type conversions (Chapter 1 DEIS).The portion of the article that discusses buffers was found to be irrelevant to this project. Part of the topic description as presented by the commenter implies the paper addresses the specific use of clearcutting – which is irrelevant to this project.
Artley, Dick	"Timber harvest operations have been shown to have many effects on adjacent watercourses and on the aquatic ecosystems they support. This may occur from introductions or loss of woody debris, loss of riparian vegetation, accelerated stream bank and bed erosion, the alteration of natural channel form and process, and the reduction of stream habitat diversity. However, the existing literature indicates one of the most insidious effects of logging is the	This comment that was included in "Opposing Views" discusses the potential for sedimentation from timber harvesting. The soils and water quality report have assessed the effects from all treatments, see page 27-31 (a summary of effects) and 64-135 of the soils and watershed report and 51-90 of the water quality and riparian report. Also see chapter 2 of the FEIS for the comparison of alternatives table. In alternative A, soil disturbance could exceed threshold and range from 0

	elevation of sediment loads and increased sedimentation within the drainage basin. Sediment generation from various forestry practices has been studied extensively in the past. Forestry practices which generate suspended sediments include all operations that disturb soil surfaces such as site preparations, clear-cutting, log skidding, yarding, slash burns, heavy equipment operation and road construction and maintenance."	to 33 percent due to unmitigated fire risk. Implementation of alternatives B and C is expected to maintain, improve and protect long-term soil productivity and watershed function better than D because the vast majority of D does not follow mechanical treatments with prescribed fire necessary (to maintain soil productivity and watershed function processes). The absence of prescribed fire following mechanical treatments increases the risk of uncharacteristic fire that could result in areas of high burn severity which leads to accelerated erosion, runoff and sediment delivery into connected streamcourses following storm events. Implementation of alternative C is likely to better restore grasslands than alternative B. Implementation of alternatives B and C would reduce the risks to life, property, soil productivity and water quality from post wildfire storm events (flooding and debris flows) much better than A and D. With implementation of identified soil and water BMPs, ADEQ water quality standards would be met.
Artley, Dick	"Timber harvest will remove dead and dying material from the site and inhibit the recruitment of downed woody material as time progresses. Timber harvest and associated reduced structural complexity and reduced age and size class diversity are all known to reduce population abundance and diversity of ants and a number of birds. For instance, ants are documented to require downed woody material in a variety of sizes and in all stages of decomposition (Torgersen and Bull, 1995). This is an attribute that is negatively correlated with harvest of the dead and dying trees and positively correlated with natural succession, especially after disturbance. Ants and birds are known to predate on insect species which cause mortality to trees, serving as a potentially important population control in the case of epidemics or before they occur (Campbell, Torgersen and Srivastava, 1983). Structural and functional characteristics associated with unlogged forests are also important for canopy arthropods, which play an important role in regulating pest outbreaks (Schowalter, 1989). Structural complexity, functional diversity, diversity of ecological process and diversity of structure in roadless areas are all expected to be less susceptible to the outbreak of pests and regulate insect activity in surrounding homogenized forests (Schowalter and Means, 1989; Franklin, Perry, Schowalter,	This literature presents basic concepts of ecology (topics include “what is soil”, “soils and nutrient cycles”) and concludes “Creative, thoughtful policies based on valid scientific assumptions will help us move toward better long-term stewardship of our National Forests.” A key element of the purpose and need of the 4FRI project (DEIS, page 8 to page 29) is to increase forest structural complexity, functional diversity, and ecological processes. The terrestrial wildlife specialist report in appendix 8 discusses the impacts and requirements to understory dependent species and species that prey on them. In conclusion, this paper did not provide anything that is not already addressed in the analysis by complying with law, regulation, and policy.

	Harmon, McKee and Spies, 1989). A large body of scientific evidence also indicates that increased edge effect and increased sunlight into stands, resulting from reduced canopy cover associated with timber harvest, can directly promote the population abundance, productivity and persistence of insects which cause mortality to trees of (Roland, 1993; Rothman and Roland, 1998; Kouki, McCullough and Marshall, 1997; Bellinger, Ravlin and McManus, 1989)."	
Artley, Dick	"The biggest ecological con job in years is being waged by the U.S. Republican party and their timber industry cronies. They are blaming the recent Western wildfires on environmentalists, and assuring the public that commercial logging will reduce the risk of catastrophic wildfires."	This is a newspaper article on political views. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the responsible officials to consider.
Artley, Dick	"According to a 1998 poll by a firm that has worked for several Republican House members and two presidents, 69 percent of Americans oppose commercial logging on federally owned land. The Forests Service's own poll showed that 59 percent of Americans who expressed an opinion oppose timber sales and other commodity production in national forests." "Many Americans are surprised to learn that logging is even allowed on public lands. Alas, it has been since the Organic Act of 1897 first authorized logging in America's new forest reserves. That legislation called for watershed protection and a steady supply of timber - what the Forest Service calls 'multiple use.' " "But the agency has been unable to balance those goals. More often than not, the integrity of the forest ecosystem has been sacrificed to maximize timber and other commodities. And at taxpayer expense, notes Bernie Zaleha, chair of the End Commercial Logging on Federal Lands (ECL) campaign. The Forest Service lost $2 billion on its logging program from 1992 to 1997, according to the General Accounting Office. It spends more on building roads and preparing sales than it gets back in timber receipts."	The desired conditions for the project are landscape restoration (DEIS p 8-29), not commercial timber production. The effects of the proposed actions to restore the landscape are disclosed in Chapter 3 of the DEIS and the corresponding resource specialists reports that are included by reference.
Artley, Dick	"Federal auditors have found that the Forest Service frequently fails to assess, prevent or correct environmental damage from logging on the national forests. After inspecting 12 timber projects in the field from 1995 to 1998, the Agriculture Department's inspector general found that all were deficient and that 'immediate corrective action is needed.' A new report on the audits found that the environmental studies required before logging was approved were poorly done, the	This is a newspaper article regarding logging damage nationwide and is not relevant to this project and provides no meaningful information that would assist the responsible official in mitigating impacts. The DEIS discloses the predicted effects of the vegetation proposed actions, see page 121 to page 149.

	rules to protect streams and wildlife habitat from undue damage during logging were not followed, and the steps planned to repair some of the harm after logging were not carried out. The inspector general, Roger C. Viadero, reported on Jan. 15 to Mike Dombeck, chief of the Forest Service, that the review had found ''numerous serious deficiencies.'' Agency officials generally agreed with the report's conclusions and recommendations."	
Artley, Dick	"The timber harvest shouldn't be dominant. It should be on an equal plane with recreation concerns, with wildlife concerns, hunting, fishing, protecting our cultural heritage. That's what the American public is asking us to do."	This is a quote from the former Forest Service Chief during a television interview regarding projects that provide multiple benefits. The 4FRI project purpose and need is designed to move towards desired conditions for multiple resources. The purpose and need is to promote and maintain ecosystem resilience, sustainability, and health under current and also changing and uncertain future environmental conditions (such as those driven by climate change and increasing human use) through the restoration of key ecological processes (e.g., returning fire to the landscape, restoring watershed function), biodiversity, wildlife habitat, and structural heterogeneity (DEIS, pp. 8-29).
Artley, Dick	"I recently read a letter from a line officer who chided local managers for being behind schedule relative to meeting the region's 'timber targets.' My expectation is that line officers will demand similar accountability for meeting watershed restoration, fish and wildlife habitat, riparian, recreation, cultural resource, and wilderness management goals." "We need to do a better job talking about, and managing for, the values that are so important to so many people. Values such as wilderness and roadless areas, clean water, protection of rare species, old growth forests, naturalness -- these are the reasons most Americans cherish their public lands." "Fifty years ago, Aldo Leopold wrote his seminal work, A Sand County Almanac. In it, Leopold spoke of his personal land ethic and the need for land managers to extend their own ecological conscience to resource decisions. The Forest Service natural resource agenda is an expression of our agency's land ethic. If we are to redeem our role as conservation leaders, it is not enough to be loyal to the Forest Service organization. First and foremost, we must be loyal to our land ethic. In fifty years, we will not be remembered for the resources we developed; we will be thanked for those we maintained and restored	This is a quote from correspondence authored by a former Chief of the Forest Service regarding projects that provide multiple benefits. Please see our response to #224-7.

	for future generations."	
Artley, Dick	"For much of the past century the Forest Service, entrusted as the institutional steward of our National Forests, focused its management on an industrial-scale logging program. The result of the massive logging and road construction program was to damage watersheds, destroy wildlife habitat and imperil plant and animal species." "The continued logging of our National Forests also wastes American tax dollars and diminishes the possibilities of future economic benefits. The Forest Service lost $2 billion dollars on the commercial logging program between 1992-1997. Annually, timber produces roughly $4 billion while recreation, fish and wildlife, clean water, and unroaded areas provide a combined total of $224 billion to the American economy. Forests purify our drinking water - 60 million Americans get their drinking water from National Forests. When the dramatic values of ecological goods and services are taken into account, it is clear that protecting National Forests creates more economic benefits than continued logging."	This is a newsletter regarding using vegetation management to reduce the risk of fire. The 4FRI restoration project is not "an industrial scale logging program". Please see the purpose and need statement on p 8 in the DEIS. The project also proposes decommissioning 904 miles of roads (DEIS p 41), not building more roads as the article suggests.
Artley, Dick	"The Bush administration has announced plans to greatly increase logging on federal lands in order to reduce the risk of wildfires. The Forest Service is using the fear of wildfires to allow logging companies to remove medium-and large-diameter trees that they can sell, rather than just the small trees and brush that can make fires more severe. There is little evidence to show that such logging will prevent catastrophic fires; on the contrary, logging roads and industrial logging cause wildfires. Bush is a well known supporter of the timber industry and has accepted huge sums of money from wealthy timber company leaders. He is promoting misinformation about forest fires in order to benefit timber industry campaign contributors."	This is a newsletter regarding using vegetation management to reduce the risk of fire. The 4FRI is not a HFRA project; it is restoration-based. Please see our response to 8-1/4.
Artley, Dick	"The proposition that forest values are protected with more, rather than less logging, and that forest reserves are not only unnecessary, but undesirable, has great appeal to many with a vested interest in maximizing timber harvest. These ideas are particularly attractive to institutions and individuals whose incomes depend upon a forest land base. (page 2)" "On the other hand, approaches that involve reserving of a portion of the land base, or harvest practices that leave commercially valuable trees uncut to achieve ecological goals,	The paper appears to suggest that treatments should be designed to promote vegetation diversity. The purpose and need and treatments proposed would increase vegetation heterogeneity and diversity in the project area (see DEIS p 8-29).

	are often considered much less desirable as they reduce traditional sources of timber income. (page 2)"	
Artley, Dick	"Consequently, we specifically criticize the "simplified structure-based management" approaches derived from simple structural models and traditional silvicultural systems such as clearcutting. In our view, the assumptions underpinning simplified structure-based management (SSBM) are not supported by the published scientific literature on structural development of natural forests, disturbance ecology, landscape ecology and conservation biology, or by the relationships between ecosystem structures and processes. In this report, we review scientific findings associated with each of these areas with particular attention to the over-simplified structural models associated with SSBM and the importance and viability of forest reserves to achieve various ecological goals. (page 2) "We do not believe, however, that scientific literature or forestry experience supports the notions that intensively managed forests can duplicate the role of natural forests, or that sufficient knowledge and ability exist to create even an approximation of a natural old-growth forest stand." (page 3)	This paper addresses the use of traditional silvicultural methods that may include “clearcuts”. The 4FRI is using restoration treatments based on soil, stand designation (habitat type, special uses), erosion potential, etc. ‘Commercial logging’ is not an objective of the 4FRI and clear cuts will not be employed. Please see the Silviculturist Report and the Implementation Plan (Appendix D) for the DEIS for more information on the design of the proposed treatments.
Artley, Dick	"But the majority of the protesters were angry about Bush's plans to implement rules that would thin our national forests to reduce fire risk. Cascadia Forest Alliance volunteer Carrie Taylor said Bush's plan to log mature and old forests "will only increase fire risks while providing taxpayer subsidized logs to the timber industry." "According to the Cascadia Forest Alliance, under the Bush proposal, 'environmental laws and citizen involvement will be undermined or suspended so that federal land management agencies can increase logging and roadbuilding on public lands, one of the timber industry's highest priorities.'"	This is a newsletter regarding environmental policy during the George W. Bush term. See our response to comment #224-4.
Artley, Dick	"Most of the trees that need to be removed to reduce accumulated fuels are small in diameter and have little or no commercial value." "Mechanically removing fuels (through commercial timber harvesting and other means) can also have adverse effects on wildlife habitat and water quality in many areas. Officials told GAO that, because of these effects, a large-scale expansion of commercial timber harvesting alone for removing materials would not be feasible. However, because the Forest Service relies on the timber program	This report discusses the threats to address wildfire. The 4FRI project purpose and need is designed to move towards desired conditions for multiple resources. The purpose and need is to promote and maintain ecosystem resilience, sustainability, and health under current and also changing and uncertain future environmental conditions (such as those driven by climate change and increasing human use) through the restoration of key ecological processes (e.g., returning fire to the landscape, restoring watershed function), biodiversity, wildlife habitat,

	for funding many of its activities, including reducing fuels, it has often used this program to address the wildfire problem. The difficulty with such an approach, however, is that the lands with commercially valuable timber are often not those with the greatest wildfire hazards." "The recent concern over the poor health of western pine ecosystems has been attributed at least partly to inappropriate silvicultural practices, both before and since the national forests were established. (4) Because of the timber industry's needs, logging in mixed conifer stands has emphasized cutting the large pines and leaving the true firs and Douglas-fir to dominate the remaining stands. (5) However, true firs and Douglas-fir are more susceptible to the damage (including insect and disease attacks as well as direct damage) that has occurred during the decade-long drought in the interior West, and thus may contribute to the risk of catastrophic wildfires. Salvage sales are one tool that can be used to improve forest health, (6) but critics object to granting the agency the discretion to use timber sales to correct problems partially created by past timber sales." "A more general concern in some quarters is over Forest Service "bias" toward timber outputs, at the expense of ecosystem conditions and other resource values. While timber harvests are important, other important values are not measured, and managers are not rewarded for achieving these other values. (7) Some have attributed this "bias" to inappropriate incentives, particularly related to the agency's numerous trust funds and special accounts. (8) The Forest Service has several trust funds and special accounts that are either funded by timber revenues or provide funds for timber management (or both). (9)" "One trust fund often cited by critics is the Knutson-Vandenberg (K-V) Fund. This account receives an unlimited portion of timber sale receipts, to be used for reforestation, timber stand improvements, and other resource mitigation and enhancement activities in timber sale areas. Forest Service managers can, therefore, fund their programs from timber sales; in the words of one critic, wildlife managers have an incentive to support timber sales that damage wildlife habitat, because they can use the revenues to mitigate that damage and to keep	and structural heterogeneity (DEIS, pp. 8-29).
Artley, Dick	themselves and their staffs employed. (10)"	The purpose and need for the project (DEIS, pp. 8-29) identifies past practices that have contributed to the existing condition which includes excessive stand density and reduced resiliency to disturbances including insect and disease. Also see our response to 8-1/4.

Artley, Dick	"In April 1999, the General Accounting Office issued a report that raised serious questions about the use of timber sales as a tool of fire management. It noted that "most of the trees that need to be removed to reduce accumulated fuels are small in diameter" -- the very trees that have 'little or no commercial value.' " "As it offers timber for sale to loggers, the Forest Service tends to 'focus on areas with high-value commercial timber rather than on areas with high fire hazards,' the report said. Its sales include 'more large, commercially valuable trees' than are necessary to reduce the so-called accumulated fuels (in other words, the trees that are most likely to burn in a forest fire)." "The truth is that timber sales are causing catastrophic wildfires on national forests, not alleviating them. The Sierra Nevada Ecosystem Project Report, issued in 1996 by the federal government, found that 'timber harvest, through its effects on forest structure, local microclimate and fuel accumulation, has increased fire severity more than any other recent human activity.' The reason goes back to the same conflict that the G.A.O. found: loggers want the big trees, not the little ones that act as fuel in forest fires." "After a 'thinning' timber sale, a forest has far fewer of the large trees, which are naturally fire-resistant because of their thick bark; indeed, many of these trees are centuries old and have already survived many fires. Without them, there is less shade. The forest is drier and hotter, making the remaining, smaller trees more susceptible to burning. After logging, forests also have accumulations of flammable debris known as "slash piles" -- unsalable branches and limbs left by logging crews."	This is a newspaper article/newsletter regarding environmental policies. Please see our response to 8-1/4. Also, note the old tree implementation plan (Appendix D, Section C of the DEIS, p 644-645) that retains old trees on site for all alternatives and the large tree implementation plan (Appendix D, Section D of the DEIS p 646-654) that guides the removal of large trees in Alternative C (the preferred alternative) that tis counter to what is stated in the article. Because this is a restoration project (DEIS p 8-29), the focus is on structure, pattern and composition of the forest, and not commercial timber harvest. In response to comments from the DEIS, the FEIS also has additional language in the clarifies large trees retention where possible that ties to the Collaborative Forest Landscape Restoration Act in Chapter 1, as well as further clarification in the Implementation Plan.
Artley, Dick	"The Forest Service keeps the vast majority of timber sale revenues, which gives it a perverse incentive to do more cutting. It has developed a huge bureaucracy around the selling of timber from national forest land."	This is a newspaper article / newsletter regarding environmental policies. Please see our response to #224-4.
Artley, Dick	"Recent editorials by timber industry spokespersons are a wildly misleading attempt to promote increased logging of western U.S. forests under the guise of reducing wildland fires …"	Newsletter regarding environmental policies. See the response to comment #224-4.
Artley, Dick	"Logging reduces the organic parent material (duff and woody residues) available for soil-formation processes."	This is an article regarding soil organic material in Montana. See the response to #224-2.
Artley, Dick	"For too long, we foresters took the public for granted, assuming unwavering support for those who grow the nation's wood fiber. Few	This is a newsletter regarding environmental policies in Tennessee. The 4FRI restoration project was developed in collaboration with interested

	noticed when the public's mood changed, and those who did were often ridiculed by disbelieving colleagues. Now we come to a day of reckoning: the public believes forests are too important to be entrusted to foresters. To restore lost confidence, foresters must first come out of hiding. We have a lot of explaining to do because, where forests are concerned, the public will no longer support what it cannot see and understand. Regaining the public's trust will take time. We must be prepared to answer hard questions about what we are doing and how our actions are impacting the environment. We must also help the public think through its forest management options. When we lay out these options, we must speak of much more than trees. Only then will our critics know we love forests as much as they do."	and affected parties. The background of the project is discussed in detail on pages 7 and 8 of the DEIS. The collaborative process that was used to develop the project is discussed on pages 39-40 and 47 and of the DEIS.
Artley, Dick	"SEC. 3. FINDINGS. Congress finds the following: Commercial logging has many indirect costs which are very significant, but not easily measured, such as flooding damage and relief of flooding damage through Federal funds, damage to the salmon fishing industry; and harm to the recreation and tourism industries."	This Congressional bill from 2001 was reviewed and was found to be irrelevant to the 4FRI project. It does not provide any meaningful information that would assist the responsible official in making a decision.
Artley, Dick	"Human tampering with nature has not been without costs. Human manipulation of existing ecosystems has also sometimes had unfortunate consequences."	Please see our response to #224-4.
Artley, Dick	"In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. Correlation coefficients of area logged with rate of spread were > 0.57 for five of the six river basins (table 5). Rate of spread for the Pend Oreille and Wenatchee River basins was strongly associated (r-0.89) with area logged. Correlation of area logged with flame length were > 0.42 for four of six river basins (table 5). The Deschutes and Methow River basins showed the strongest relations. All harvest techniques were associated with increasing rate of spread and flame length, but strength of the associations differed greatly among river basins and harvesting methods." (pg.9) "As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-	This is an article on forested landscapes in Oregon and Washington. The fire analysis for the 4FRI is based on knowledge of the project area, the best available science and information, and experience with similar projects in similar vegetation. Ponderosa pine has distinct variations within its geographic range (refer to Oliver, W.W. and R.A. Ryker. 1990. Pinus ponderosa. Pp. 413-424 in R.M. Burns and B.H. Honkala (technical coordinators) Silvics of North America, Vol. 1. Agri. Handbook 654, USDA For. Serv., Washington, D.C.), and the populations of ponderosa pine in northern Arizona have some fundamental genetic differences from pines in other areas within the range of Ponderosa spp. (Conkle and Critchfield, 1988 Genetic Variation and Hybridication of Ponderosa Pine' in Symposium Proceedings: Ponderosa Pine the Species and its Management. Morphologically), there are differences in the openness of crown growth, number of needles, and other characteristics. These two populations should not be expected to have identical fire regimes, even if the study was restricted to ponderosa pine. No clear cutting is

	behavior hazards associated with the residues can extend, however, for many years depending on the tree. Even though these hazards diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon."	proposed in the 4FRI. Activity fuels would be managed in accordance with forest plan guidance for coarse woody debris. The effects of proposed actions to fire behavior are disclosed in the fire ecology portion of Chapter 3 (DEIS p149-165), and in the fire ecology specialist report. Rates of spread due to thinning are disclosed on page 131-132 of the fire ecology specialist report for the DEIS-they note that rates of spread for surface fires are expected to increase, however crown fire is expected to decrease.
Artley, Dick	The Quincy Library Group's (QLG's) fuelbreak strategy represents a giant step backwards from the progressive development of rational fire policies established by the 1995 Federal Wildland Fire Management Policy and Program Review." "The fact that the QLG admits that its Plan is inconsistent with these new policies (indeed, is almost gleefully defiant of them) says a lot about the credibility of the QLG's self-purported fire management expertise." "In spite of (or more likely because of) the intensive 'fuels reduction' activities associated with commercial logging, the Fountain Fire was truly catastrophic in its effects." "Even 'kinder, gentler' commercial logging still inflicts environmental impacts such as eroded topsoil, degraded water quality, destroyed wildlife habitat, and extirpated species that are every bit as much symptoms of forest health problems as large-scale, severe wildfires." "And after spending millions of dollars creating the SNEP Report, it seems wise to use its information, not ignore it or opportunistically select out statements clearly worded as assumptions, values, or goals which run contrary to factual research findings. The QLG Plan has much more to do with timber extraction than with genuine fire protection, and in that respect, it constitutes more of a forest health threat than a real solution." "The QLG Bill resembles similar 'panic legislation' that was passed during the early 1970s in which, following some large-scale wildfires in California, Congress allowed the Forest Service to access emergency firefighting funds to conduct 'presuppression' timber sales. Many fuelbreaks were cut in the Sierras during this period, and while costs rapidly rose into tens of millions of dollars, most of these fuelbreaks failed to perform adequately during wildfire suppression incidents. Congress quickly had to take away this funding source from the Forest Service. What has become of these old fuelbreaks?	This is an unpublished report related to Quincy Library Group's activities and is not relevant to the Four Forest Restoration Project. The Quincy Library Group Plan had very different objectives and included very different ecosystems than the 4FRI. See the background and purpose and need for the project on page 8 to 29 of the DEIS.

Artley, Dick	Almost without exception, the agency failed to monitor or maintain them, and in a modern-day version of 'cut and run' logging, many of these old fuelbreaks have converted to chaparral brush and 'dog-hair' thickets ? a much more flammable vegetation type than the original forest cover. The QLG Bill appears to be 'deja vu' without evidence of Congress or the QLG being aware of this history of previous fuelbreak programs." "The notion that commercial logging can prevent wildfires has its believers and loud proponents, but this belief does not match up with the scientific evidence or history of federal management practices. In fact, it is widely recognized that past commercial logging, road-building, livestock grazing and aggressive firefighting are the sources for "forest health" problems such as increased insect infestations, disease outbreaks, and severe wildfires." "How can the sources of these problems also be their solution? This internal contradiction needs more than propaganda to be resolved. It is time for the timber industry and their supporters to heed the facts, not fantasies, and develop forest management policies based on science, not politics."	This is an unpublished report related to wildfire prevention. See the response to #224-23.
Artley, Dick	"Since the 'New Perspectives' program of the early 1990s, the agency has tried to dodge public opposition to commercial logging by using various euphemisms, such as this gem from the Siskiyou National Forest: Clearcuts are called 'minimum green tree retention units.' Accordingly, Forest Service managers have believed that if they simply refer to logging as 'thinning,' or add the phrases 'fuels reduction' or 'forest restoration' to the title of their timber sale plans, then the public will accept these projects at face value, and business-as-usual commercial logging can proceed. In the face of multiple scandals and widespread public skepticism of the Forest Service's credibility, it seems that only Congress is buying the agency's labeling scheme."	This is a newspaper article on logging on the Siskiyou National Forest. See response #224-4.
Artley, Dick	"Thus, the use of commercial logging for fire hazard reduction poses yet another paradox: Logging removes the trees that normally survive fires, leaves behind the trees that are most often killed by fire, increases flammable fuel loads, and worsens fire weather conditions." (pg. 5)	This is a newspaper article on logging and fire. See response to #224-23 and to #224-11. The 4FRI is using restoration treatments based on soil, stand designation (habitat type, special uses); erosion potential, etc. 'Commercial logging' is not an objective of the 4FRI.
Artley, Dick	"In the face of growing public scrutiny and criticism of the agency's	This is a newspaper article on logging and fire in Montana. See response

	logging policies and practices, the Forest Service and their enablers in Congress have learned to mask timber sales as so-called 'fuels reduction' and 'forest restoration' projects. Yet, the net effect of these logging projects is to actually increase fire risks and fuel hazards." "Decades of encouraging private logging companies to take the biggest, oldest, most fire-resistant trees from public lands, while leaving behind a volatile fuel load of small trees, brush, weeds, stumps and slash has vastly increased the flammability of forestlands." "In addition to post-fire salvage logging, the Forest Service and timber industry advocates in Congress have been pushing pre-fire timber sales, often falsely billed as hazardous fuels reduction or 'thinning' projects, to lower the risk or hazard of future wildfires. In too many cases, these so-called thinning projects are logging thick-diameter fire-resistant overstory trees instead of or in addition to cutting thin-sized fire-susceptible understory trees. The resulting logging slash and the increased solar and wind exposure can paradoxically increase the fuel hazards and fire risks."	8- 2/23.See 'Chapter 1 – Purpose and Need for Action' in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative.
Artley, Dick	"More than any other recent human activity, the legacy of commercial timber extraction has made public forests more flammable and less resilient to fire. Firstly, clearcut and high-grade logging have historically taken the largest, most fire-resilient, most commercially-valuable trees, and left behind dead needles and limbs (logging debris called "slash"), along with smaller trees and brush that are less commercially valuable but more flammable than mature and old-growth trees. The net effect is to increase the amount of available hazardous fuel." "Secondly, the removal of large overstory trees also changes the microclimate of logged sites, making them hotter, drier, and windier, which increases the intensity and rate of spread of wildfires. Third, the creation of densely-stocked even-aged plantations of young conifers made sites even more flammable since this produced a solid mass of highly combustible conifer needles within easy reach of surface flames. These changes in the fuel load, fuel profile, and microclimate make logged sites more prone to high-intensity and high-severity wildfires."	This is a news release from Public Employees for Environmental Responsibility. There is nothing from Igalsbee that is applicable to the 4FRI analysis.
Artley, Dick	"Linear developments may result in habitat avoidance for grizzly bears. Logging-truck traffic in the Kimsquit Valley in British Columbia resulted in a 78% reduction in use of the "Zone of Hauling Activity"	This is an article on grizzly bears and wolverines related to habitat fragmentation. Grizzly bears and wolverines do not occur in Arizona and the article is not relevant to the 4FRI analysis area. But the DEIS

	by radio collared bears compared to non-hauling periods (16). For 14 hours/day, 3%-23% of each bear's home range was unavailable to them because of disturbance." "The impacts of land-use activities on wolverines are likely similar to those on grizzly bears. Wolverines seem to have been most affected by activities that fragment and supplant habitat, such as human settlement, extensive logging, oil and gas development, mining, recreational developments, and the accompanying access. Wolverine populations that are now at the edge of extirpation have been relegated to the last available habitat that has not been developed, extensively modified, or accessed by humans."	discusses habitat connectivity for wildlife species on pages 174 and on page 40 of the wildlife specialist report. The complete analysis for bridge habitat for canopy-dependent wildlife can be found in appendix G of the DEIS and appendix 3 of the wildlife report. The terrestrial wildlife specialist report discloses habitat fragmentation for wildlife species in several areas: page 120 for four spotted skippling; page 144, 585 and 592 for pronghorn; page 176 discusses climate change and habitat fragmentation; page 194 for the Mexican spotted owl; page 375 for nitocris fritillary; page 380 for Navajo Mogollon vole; page 385 for long-tailed vole; page 386 for the dwarf shrew; page 388 for the Merriam's shrew; page 521-523, 634, and 674 for effects to understory species. Habitat effects could be similar to those that would occur with severe wildfire and could ultimately lead to habitat fragmentation or vegetation type conversions (Chapter 1 DEIS). The effects of roads to wildlife is discussed in the DEIS on pages 185-186, 202, 204, 205, 208 – 210, and 219-221.
Artley, Dick	"History, not science, refutes the claim that logging helps to prevent forest fires. The forests of the West are far more vulnerable to fire due to a century of industrial logging and fire suppression. Logging has removed most of the older, fire-resistant trees from the forests. Fire suppression has encouraged many smaller and more flammable trees, brush and dense plantations to fill the holes. Logging has set the forests of the West up to burn big and hot. More logging will not fix this."	This is an opinion piece in a newspaper article regarding logging and wildfire. Please see our response to #224-4. See 'Chapter 1 – Purpose and Need for Action' in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative.
Artley, Dick	"Fear of wildfire is heavily used to sell these forest "restoration" schemes. Logging has not been proven, in practice, to reduce fire frequency or intensity. Historically, the largest, most destructive blazes, like the Tillamook conflagration, were caused from logging or fueled by slash. Unlogged forests, cool and shaded, are typically more fire resistant than cut over, dried-up stands choked with slash and weeds. Large-scale logging (by any name) has devalued our forests, degraded our waters, damaged soils, and endangered a wide variety of plants and animals. How will the current round of politically and environmentally propelled 'restorative' logging proposals differ, in practice, from past logging regimes?"	Please see the response to #224-31.
Artley, Dick	"Timber harvesting operations affect hydrologic processes by reducing canopy interception and evapotranspiration. Many studies	This article discusses the effects of timber removal to soil and hydrology on forested hill slopes in northern California and is not relevant to the

	have documented changes in soil properties following tractor yarding (Stone, 1977; Cafferata, l983), and low-ground-pressure skidding (Sidle and Drlica, 1981). More recently, researchers have evaluated cable yarding (Miller and Sirois, 1986; Purser and Cundy, 1992). In general, these studies report decreased hydraulic conductivity and increased bulk density in forest soils after harvest."	4FRI analysis area. See response to #224-2 for information on soils and watershed analysis.
Artley, Dick	Among these four species of amphibians, the spotted salamander is most likely to be affected adversely by the logging as this species of salamander relies on dense forests with full canopies (Harding, 1997)." "Looking at the study on a larger scale, the potential for changes caused by logging is great. Absence of trees could influence water temperature by altering available sunlight, conductivity by changing the amount of organic matter that collects in the vernal ponds, or pH if the logging process deposits foreign residues to the area. Also heavy equipment used to harvest the timber has the potential to alter the terrain." "Modifications to the landscape could change how water flows and collects at the surface and change the size, shape, and location of the vernal ponds. Loss or alteration to small temporary water sources less than four hectares can be extremely detrimental to amphibians water (Semlitsch, 2000). Without vernal ponds amphibians would have difficulty inhabiting forested areas because they rely on the ponds as breeding grounds. If logging disturbs the ponds, amphibian populations could diminish in the areas that surround these vernal pools."	This article discusses the effects of logging in the Ottawa National Forest in MI on amphibians. The spotted salamander is not found in Arizona. The 4FRI DEIS discloses effects of the alternatives on relevant sensitive aquatic and semi-aquatic species and MIS, and uses science that is relevant to the Coconino and Kaibab NF (DEIS, page 201, page 245 to page 255).
Artley, Dick	"The Congressional Research Service (CRS) recently addressed the effect of logging on wildfires in an August 2000 report and found that the current wave of forest fires is not related to a decline in timber harvest on Federal lands. From a quantitative perspective, the CRS study indicates a very weak relationship between acres logged and the extent and severity of forest fires. To the contrary, in the most recent period (1980 through 1999) the data indicate that fewer acres burned in areas where logging activity was limited." "Qualitative analysis by CRS supports the same conclusion. The CRS stated: "[T]imber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these fine fuels on the forest floor increases the rate of spread of	The 4FRI is designed to return low-severity/high frequency fire to the landscape in intervals that are appropriate for this landscape. Design features that require post treatment fuels to be removed when combined with maintenance burning would reduce the potential for surface fuels to accumulate to the pre-treatment condition , see the Fire Ecology analysis in the DEIS (DEIS, pages 19 – 25; 149 - 165). See 'Chapter 1 – Purpose and Need for Action' in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative. 'Timber harvest' is not an objective of the 4FRI. Treatments were based on site-specific restoration needs.

	wildfires." Similarly, the National Research Council found that logging and clearcutting can cause rapid regeneration of shrubs and trees that can create highly flammable fuel conditions within a few years of cutting."	This is from the NRDC website about a US House of Representatives Subcommittee presentation by an attorney on an opinion of logging and wildfire. Please see our response to 8-1/4. Much of the information in this transcript is outdated, and no longer applies. For example: “Most importantly, virtually no peer-reviewed, empirical studies show that thinning forests in fact leads to a systematic reduction of subsequent fire intensity. [1] The Forest Service's Cohesive Strategy acknowledges this, noting that "[a]t landscape scales, the effectiveness of treatments in improving watershed conditions has not been well documented." [2] And a series of studies - though certainly not definitive - shows post-thinning increases in fire intensity and/or spread.” In fact, there are a plethora of data and peer-reviewed articles which support the use of mechanical treatments and/or prescribed fire to reduce the potential for uncharacteristically severe fire effects and extreme behavior. Many were published before 2001. A sample is listed below that would support thinning that would be effective in the ‘reduction of subsequent fire intensity’: Harrington, M. G. 1982. ‘Stand, Fuel, and Potential Fire Behavior Characteristics in an Irregular Southeastern Arizona Ponderosa Pine Stand. Research Note RM-418 Cohan, D., S. Haas, and P. J. Roussopoulos. 1983. ‘Decision Analysis of Silvicultural Prescriptions and Fuel Management Practices on an Intensively Managed Commercial Forest’. Forest Science vol 29(4):358-870Weatherspoon, C. 1996. Fire-silviculture relationships in Sierra forests, pp. 1167-1176 in Sierra Nevada Ecosystem Project: Final report to Congress, vol. II, Assessments and scientific basis for management options. Davis: University of California, Centers for Water and Wildland Resources. Kalabokidis, K. D., and P. N. Omi. 1998. ‘Reduction of Fire Hazard though Thinning/Residue Disposal in the Urban Interface’. International Journal of Wildland Fire. 8(1):29-35.Scott, J. H. 1998. ‘Fuel Reduction in Residential and Scenic Forests: a Comparison of Three Treatments in a Western Montana Ponderosa Pine Stand’. USDA Forest Service, RMRS-RP-5Reinhardt, E. D., and K. C. Ryan. 1998. ‘Analyzing effects of management actions including salvage, fuel treatment, and
Artley, Dick	I will turn first to forest thinning aimed at reducing fire risks. There is surprisingly little scientific information about how thinning actually affects overall fire risk in national forests." "How can it be that thinning could increase fire risks? First, thinning lets in sunlight and wind, both of which dry out the forest interior and increase flammability. Second, the most flammable material - brush, limbs, twigs, needles, and saplings - is difficult to remove and often left behind. Third, opening up forests promotes brushy, flammable undergrowth. Fourth, logging equipment compacts soil so that water runs off instead of filtering in to keep soils moist and trees healthy. Fifth, thinning introduces diseases and pests, wounds the trees left behind, and generally disrupts natural processes, including some that regulate forest health, all the more so if road construction is involved."	

prescribed fire on fuel dynamics and fire potential. Pages 206-209 in Teresa L. Pruden and Leonard A. Brennan (eds.). Fire in ecosystem management: shifting the paradigm from suppression to prescription. Tall Timbers Fire Ecology Conference Proceedings, No. 20. Tall Timbers Research Station, Tallahassee, FL. Scott, J. H, and E. D. Renhardt. 2000. 'Effects of alternative treatments on canopy fuel characteristics in five conifer stands'. USDA Forest Service Gen Tech. Rep. PSW-GTR Fulé, P. Z., CT. A. Heinlein, and W. W. Covington. 2001. 'Potential fire behavior is reduced following forest restoration treatments'. Pp. 22-28 in Ponderosa pine ecosystems restoration and conservation: Steps toward stewardship, ed. R. K. Vance et al. Proceedings RMRS-22. Ogden, Utah: USDA Forest Service. Fulé, P. Z., A. E. M. Waltz, W. W. Covington, and T. A. Heinlein. 2001. 'Measuring Forest Restoration Effectiveness in Reducing Hazardous Fuels'. Journal of Forestry. Pollet, J. and P. N. Omi. 2002. 'Effect of thinning and prescribed burning on crown fire severity in ponderosa pine forests'. International Journal of Wildland Fire. Vol 1(1):1 – 10.Omi, P. H., and E. J. Martinson. 2003. 'Performance of Fuel Treatments Subjected to Wildfires. USDA Forest Service Proceedings RMRS-P-29Fiedler, C. E., and C. E. Keegan. 2003. 'Reducing Crown Fire Hazard in Fire-Adapted Forests of New Mexico'. USDA Forest Service Proceedings RMRS-P-29.Omi, P. H., and E. J. Martinson. 2004. 'Effectiveness of Thinning and Prescribed Fire in Reducing Wildfire Severity'. USDA Forest Service Gen. Tech. Rep. PSW-GTR-193Harrod, R. J., N. A. Povak, and D. W. Peterson. 2009. 'Thinning and prescribed fire effects on overstory tree and snag structure in dry coniferous forests of the interior Pacific Northwest'. Forest Ecology and Management 258: 712-721.Omi, P. N. and E. J. Martinson. 2009. 'Effectiveness of Fuel Treatments for Mitigating Wildfire Severity: A Manager-Focused Review and Synthesis. JFSP Project Number 08-2-1-09 – Final Report. This is just a small sampling of the information available at the time, and more recent literature on the subject. It's hard to understand how anyone involved in wildland fire in 2001 could be unaware of the existing research and the increasing focus on fuel treatments. Regardless, that statement was incorrect then, and it not valid today. Research on the effectiveness of thinning began long before 2001, and is still going on. "…canopy fuel treatments reduce the potential for crown fire at the expense of slightly increased surface fire spread rate and intensity.

		However, critical levels of fire behavior (limit of manual or mechanical control) are less likely to be reached in stands treated to withstand crown fires, as all crown fires are uncontrollable. Though surface intensity may be increased after treatment, a fire that remains on the surface beneath a timber stand is generally controllable." (Scott 2003)See 'Chapter 1 – Purpose and Need for Action' in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative. 'Timber harvest' is not an objective of the 4FRI. Treatments were based on site-specific restoration needs.
Artley, Dick	"Those who would argue that this form of logging has any positive effects on an ecosystem are clearly misinformed. This type of logging has side effects related to wildfires, first and foremost being that the lumber companies aren't interested in hauling out all the smaller trees, branches, leaves, pine needles, sawdust, and other debris generated by cutting all these trees. All this debris is left on site, quickly dries out, and is far more flammable sitting dead on the ground than it was living in the trees. Smaller, non-commercially viable trees are left behind (dead) as well - creating even more highly flammable fuel on the ground.	This is a newspaper article on an opinion of logging and wildfire. See response #224-4.
Artley, Dick	"We concluded that commercial timber sales do not meet the criteria for forest restoration." (Pg. 11)	The link provided was not valid. However we reviewed the report by using this link: http://www.usda.gov/oig/webdocs/08601-26-SF.pdf. This was an OIG report that provided a review of the National Fire Plan. The statement provided was taken out of context and the highlight of this statement is related to budget. The conclusion was solely based on review of a Bitterroot NF project. The missing sentences that should go with the statement provided are: "According to the FS' FY 2002 Budget Justification, all costs associated with a timber sale (planning, preparing, and USDA/OIG-A/08601-26-SF Page 12 administering) are included in the Forest Products Budget Line Item of the National Forest System appropriation, except when the primary purpose of a timber sale is some other land management objective such as wildlife habitat improvement or hazardous fuels reduction." (OIG Report, page 11).
Artley, Dick	"In hopes of ending conflicts over "multiple use," an independent scientific committee has proposed that "ecological sustainability" should become the principal goal in managing the U.S. national forests and grasslands, which since 1960 have been under a	This article focused on sustainability in forests. See response #224-7.

	congressional mandate to serve industry, recreation, and conservation all at once."	
Artley, Dick	"Logging removes a mass that harbor a myriad of organisms, from bacteria and actinomycetes to higher fungi. The smaller organisms, not visible to the unaided eye, are still important components of the system."	This GTR report discusses soil biodiversity. The soils analysis addresses the potential impacts to soil productivity. See response 8-1/2 which describes where the analysis can be found in the DEIS. Snags, coarse woody debris (CWD), oaks, and large diameter trees are some of the essential habitat components in the Southwest that are used by a wide variety of vertebrates and invertebrates for shelter, hiding cover, denning, nesting, resting areas and food sources. Methods used to restore these habitat components may include protection of large existing snags, creation of snags during prescribed burning, development of understory by removing of dense forest conditions and leaving trees as downed logs to increase availability of coarse woody debris (CWD). See appendix 8 of the wildlife specialist report for the discussion of understory response to overstory change. The decision for this project will consider how the project affects biodiversity by evaluating benefits to ecological processes and function (soil productivity, watershed function, the role of natural disturbances, etc.).
Artley, Dick	"Logging removes mature and maturing trees which conserve essential elements, whereas the area containing new very young planted trees following logging are susceptible to erosion and essential element loss." (pg.5) "Logging removes tree parts that would have created and maintained diversity in forest communities." (pg. 44)	A key component of the project is to improve forest structure (DEIS, page 9-17). The silvicultural analysis describes the post treatment effects to forest structure (age and size class diversity, old growth, large and old trees) and implications to MSO and goshawk habitat. The analysis is on page 124 through 149 of the DEIS.
Artley, Dick	In addition to the direct effects of habitat loss and fragmentation, logging typically reduces ecosystem health by: a) damaging aquatic habitats through siltation, reduction in stream complexity and increased water temperatures."	This general technical report (GTR) discusses the effects of habitat loss and fragmentation to aquatic systems in Washington and Oregon. The aquatic analysis for this project is located on page 245 to 255 of the DEIS. Potential impacts to aquatic resources are compared to the sediment outputs predicted in the soils and hydrology specialist report (Steinke 2013, MacDonald 2013). The soils and watershed analysis concluded soil disturbances would range from 2.9 percent (lowest in alternative D) to 3.4 percent (highest in alternative C). All action alternatives provide long term soil improvement and protection of soil productivity and watershed function. No watershed would have soil disturbance above 11percent (4 percent below the 15 percent threshold). Soil productivity and watershed function should be maintained. In alternative A, soil disturbance could range from 0 to 33

		percent due to unmitigated fire risk. With implementation of identified soil and water BMPs, ADEQ water quality standards would be met. The primary environmental consequence to aquatic habitat and associated species from timber and vegetation treatments would be increased ground disturbance which has the potential to increase the rate of soil erosion over natural background levels (DEIS, page 248). The analysis states, “Direct effects of vegetation management on stream systems should be minor when Forest Service BMPs are followed (Southwestern Region FSH 2509.22) (see appendix C of the DEIS for all mitigation and BMPs). Limiting vegetation management activities from impacting stream courses should lead to minor or inconsequential direct effects to streams habitat and their associated biota. Buffer strips of at least 70 feet to 120 feet (BMP 8; Steinke 2013) would be used to protect stream courses” (DEIS, page 249).
Artley, Dick	"Logging practices can indirectly result in changes in the biological components of a stream, and can have direct and indirect on the physical environment in streams. The primary environmental changes of concern are the effects of siltation, logging debris, gravel scouring, destruction of developing embryos and alevins, blockage of streamflow, decrease in surface and intragravel dissolved oxygen, increase in maximum and diel water temperatures, changes in pool/riffle ratios and cover, redistribution of fishes, reduction in fish numbers, and reduction in total biomass."	This article discusses the effects of habitat loss and fragmentation to aquatic systems. See response to #224-43.
Artley, Dick	"Biodiversity in managed ecosystems is poor. Less biodiverse communities and ecosystems are more susceptible to adverse weather (such as drought) and exotic invaders, and have greatly reduced rates of biomass production and nutrient cycling." "All of these studies show that ecosystem functioning is decreased as the number of species in a community decreases. Declines in functioning can be particularly acute when the number of species is low, such as in most managed ecosystems including croplands or timber plantations." "Recent evidence demonstrates that both the magnitude and stability of ecosystem functioning are likely to be significantly altered by declines in local diversity, especially when diversity reaches the low levels typical of managed ecosystems."	The link provided is broken but a search revealed this site for the article cited: http://www.esa.org/esa/wp-content/uploads/2013/03/issue4.pdfThis article discusses biodiversity and ecosystem functioning. The purpose and need for the project is to increase resiliency and ecosystem function in the project area which results in increased biodiversity. See DEIS page 8 to page 29. Also, please see the response to #224-41.
Artley, Dick	"As a result of the Forest Service's well-documented mismanagement over many years of the timber sale program, taxpayers also have	This is an opinion piece in a newsletter regarding environmental policy. See response #224-4.

	been stuck with the tab for hundreds of millions of dollars worth of subsidies to a profitable timber industry."	
Artley, Dick	"Agroforestry does reduce biodiversity. In forests used for logging, whole-landscape management is crucial. Here, emphasis is placed on areas of intensive use interspersed with areas for conservation and catchment purposes. Management strategies for sustainable forestry are being developed, but there is a need for further interaction among foresters, ecologists, community representatives, social scientists, and economists."	This article expresses the need for interaction amongst disciplines to develop management strategies for sustainable forestry. See response #224-7 and #224-20.
Artley, Dick	"The U.S. Forest Service has been sitting on a public opinion survey it commissioned, not knowing what to do with the results. The problem is that most people surveyed want more wilderness and less logging on the Green Mountain National Forest (GMNF), while the federal agency seems to want to build more roads and cut more trees." "The survey conducted by Dr. Robert Manning of the School of Natural Resources at the University of Vermont, polled 1,500 Vermont households in the spring of 1995. A survey with similar results was completed last fall for the White Mountain National Forest in New Hampshire. 'It is clear that New England residents value the national forest for many reasons, but non-material values, such as aesthetics and ecological protection, are more important than material values, such as economic development,' said Dr. Manning." "The responses to several survey questions indicate a strong public desire for more areas of wild, untouched nature on the GMNF and less roadbuilding and logging. Very few people supported clearcutting and other types of industrial logging, especially if natural beauty or wildlife habitat were harmed." "For example: * 82 percent wanted to ban clearcutting, * 82 percent said logging should not hurt scenic beauty, * 80 percent of the respondents wanted to protect remaining undisturbed forest; and * 72 percent urged prohibition of logging if bear or other wildlife habitat would be harmed." "Only 36 percent felt that management of the GMNF should emphasize timber and lumber products; and only 15 percent felt that jobs are more important than protection of endangered species." "'The results of this survey and a similar one on the White Mountain National Forest in Vermont should serve as loud wake-up calls to the U.S. Forest Service,' said Northup. 'Forest Service officials	This is an opinion paper that focuses on forest practices and public preferences (perhaps) in Vermont. The current forest plans provide land allocations and management direction that determines what types of activities may occur across the Coconino and Kaibab NFs. The project is based on the existing forest plan's direction and desired conditions, best available science, and work conducted with a collaborative group who is familiar with the landscape and has provided meaningful input into the desired conditions and areas proposed for treatment (see response #224-7).

	have two choices: either begin a major overhaul of the agency's management programs or ignore the wishes of the people they are supposed to serve'." "Still, forestry experts warned in the 2000 plan that logging should be used carefully and rarely; in fact, the original draft states plainly that the "removal of large merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk." "Now, critics charge that the Bush administration is ignoring that warning. Neil Lawrence, a policy analyst with the Natural Resource Defense Council, claims that Washington has taken a far more aggressive approach to incorporating commercial logging in its wildfire prevention plans. As a result, Lawrence and other critics say, the National Fire Plan is becoming a feeding ground for logging companies. Moreover, critics claim the administration's strategy, far from protecting the lives and homes of those most at risk, could	
Artley, Dick	actually increase the likelihood of wildfires." "In response to catastrophic wildfires, wide-reaching forest management policies have been enacted in recent years, most notably the Healthy Forests Restoration Act of 2003. A key premise underlying these policies is that fire suppression has resulted in denser forests than were present historically in some western forest types. Therefore, although reducing the threat of wildfire is the primary goal, forest managers commonly view fuel treatments as a means to restore historic forest structure in those forest types that are outside of their historic range of variation. This study evaluates where both wildfire mitigation and restoration of historic forest structure are potentially needed in the ponderosa pine-dominated montane forest zone of Boulder County, Colorado. Two spatial models were overlain: a model of potential fireline intensity and a model of historic fire frequency. The overlay was then aggregated by land management classes. Contrary to current assumptions, results of this study indicate that both wildfire mitigation and restoration of historic forest structure are needed in only a small part of the study area, primarily at low elevations. Furthermore, little of this land is located on Forest Service land where most of the current thinning projects are taking place. We question the validity of thinning as a	This is a newspaper article on an opinion of logging and wildfire. See response #224-4. This article references wildfire mitigation in Colorado. See 'Chapter 1 – Purpose and Need for Action' in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative. Treatments were based on site-specific restoration needs. For references supporting the use of thinning to mitigate potential fire behavior and effects see the sample of supporting references listed in response #224-37.The objectives of the Four Forest Restoration Initiative are related to restoring ponderosa pine forests; 4FRI it is not a fuels reduction project. In ponderosa pine, there is an overlap between restoration treatments and fuels reduction treatments. For example, fuels treatments often include thinning stands so trees that are evenly spaced, and 'thinning from below'. While that may change potential fire behavior and effects to something closer to the natural fire regime for a decade or so (most fire potential is reduced to low severity effects), it is not a restoration treatment, and is not intended to set the treated area on a trajectory towards more historic patterns, composition and structure. Unlike many fuels treatments, the restoration treatments proposed by the 4FRI address the structure of the entire forest – vertically and horizontally, which changes fire behavior and effects,
Artley, Dick	means both to reduce the threat of wildfire and to restore historic	while putting the forest on a trajectory towards a more resilient,

	forest structure in the absence of site-specific data collection on past and present landscape conditions."	historic condition. Thinning of both canopy and ladder fuels is generally needed to reduce crown fire potential. Fire behavior is a primary objective in NEPA projects for which the primarily purpose is fuels reduction, and improved fire effects are a side-benefit of addressing fire behavior. Fire effects are a primary objective when restoration is the purpose of the project and, in ponderosa pine; decreased fire behavior is a side-benefit of restoration treatments. There are no 'fuel treatments' proposed by the 4FRI, they are restoration treatments. Treatments were designed based on soil types, landscape patterns, land designations, and other considerations, including potential fire effects and behavior.
Artley, Dick	"Private lands are more suitable for timber production. National Forest land is on average of lower productivity and on steeper, higher elevation terrain than are private forestlands."	This GTR report discusses the suitability of private lands and National Forest lands for timber production. See response #224-4.
Artley, Dick	"Less than 5% of America's original forests remain, and these forests are found primarily on federal lands. Logging in the last core areas of biodiversity is destroying the remaining intact forest ecosystems in the United States. At the current rate of logging, these forests and their priceless biological assets will be destroyed within a few decades. We urge Congress to pass the Act to Save America's Forests. It is the first nationwide legislation that would halt and reverse deforestation on all our federal lands. By implementing protective measures based on principles of conservation biology, the bill provides a scientifically sound legislative solution for halting the rapid decline of our nation's forest ecosystems. The Act to Save America's Forests will: * Make the preservation and restoration of native biodiversity the central mission of Federal forest management agencies. * Ban extractive logging in core areas of biodiversity and the last remnant original forest ecosystems: roadless areas, ancient forests and special areas of outstanding biological value. * Protect sensitive riparian areas and watershed values by banning extractive logging in streamside buffer zones. * End clearcutting and other even age logging practices on federal land. * Establish a panel of scientists to provide guidance to federal forest management. We believe it is our professional responsibility to ask Congress to align Federal forest management with modern scientific understandings of forest ecosystems. Passage of the Act to Save America's Forests will	This is a 1998 letter to Congress regarding environmental policy. See response #224-4.

Artley, Dick	give our nation's precious forest ecosystems the best chance or survival and recovery into the 21st century and beyond." "The Act to Save America's Forests is based on the principles of conservation biology. It would make the protection native biodiversity the primary goal of federal forest management agencies. The bill would protect over 20 million acres of core forest areas throughout the nation, including ancient forests, roadless areas, key watershed, and other special areas. It is a comprehensive, sustainable, and ecologically-sound plan for protecting and restoring the entire federal forest system. If the current pace of logging planned by the Forest Service continues, nearly all of America's ancient and roadless wild forests will soon be lost forever. According to a recent report by the World Resources Institute, only one percent of the original forest cover remains in large blocks within the lower 48 states. The Act to Save America's Forests incorporates the solution recommended by the report, namely to protect core forest areas from any logging and to allow sustainable forest practices around these protected forests. Endorsed by over 600 leading scientists, this bill may be the last hope for America's forests."	This is an opinion letter regarding environmental policy. See DEIS page 3 to page 7. Also see responses #224-4 and #224- 70.
Artley, Dick	"It is well established that logging and roadbuilding often increase both fuel loading and fire risk. For example, the Sierra Nevada Ecosystem Project (SNEP) Science Team (1996) concluded that "timber harvest…. has increased fire severity more than any other recent human activity" in the Sierra Nevada. Timber harvest may increase fire hazard by drying of microclimate associated with canopy opening and with roads, by increases in fuel loading by generation of activity fuels, by increases in ignition sources associated with machinery and roads, by changes in species composition due to opening of stands, by the spread of highly flammable non native weeds, insects and disease, and by decreases in forest health associated with damage to soil and residual trees (DellaSala and Frost, 2001; Graham et al., 2001; Weatherspoon et al., 1992; SNEP Science Team, 1996). Indeed a recent literature review reported that some studies have found a positive correlation between the occurrence of past logging and present fire hazard in some forest types in the Interior Columbia Basin (DellaSala and Frost, 2001)."	This document is testimony regarding timber harvest plans on private lands and water quality. The 4FRI DEIS biological evaluation discloses effects of the alternatives on relevant sensitive aquatic species and MIS (DEIS, page 86 to page 114).

Artley, Dick	"I will discuss my views on how activities related to timber harvest adversely affect coastal salmonids in California by destroying, altering, or otherwise disturbing the freshwater habitats upon which these fish depend during crucial phases of their life cycle. I base these opinions on my research and observations in the field, as well as my review of and familiarity with the scientific literature and publications of government agencies, commissions, and scientific review panels. Below I discuss in some detail the life history and habitat needs of coho salmon to illustrate how timber harvest and related roads affect this threatened species. Although Chinook salmon and steelhead trout have similar life histories and habitat needs, and also are negatively affected by timber harvest, I will use coho salmon in my discussion." "Loss or degradation of stream habitat has been and remains the single most significant cause of the decline of anadromous salmonids in general in the Pacific Northwest. In my experience the most pervasive and severe impacts to coastal watersheds in California inhabited by coho salmon result from logging and associated activities. These activities cause significant alteration and degradation to coho salmon habitat by 1) increasing sediment input to salmon bearing streams and their tributaries: 2) by decreasing input of LWD into waterways; 3) by altering streamflow regimes, increasing the likelihood of scouring flows and flooding; and 4) by increasing water temperatures. These pervasive changes due to timber harvest decrease the complexity and suitability of coho salmon habitat, including adversely affecting insects and other organisms that provide food for fish."	This is an article concerning the effects of logging on anadromous salmonids in the Pacific NW and is not relevant to the 4FRI project. Please see response to #8-1/54 for information regarding sensitive aquatic species and MIS.
Artley, Dick	"People moving to the region may do so for reasons related to the social environment and the physical landscape but not care about specific Federal land management practices. We found this not to be true, since 92 percent were concerned with how Federal lands were managed. The most frequent preferences for managing Federal lands were water/watershed and ecosystem protection (table 3). Timber harvesting was cited by 16 percent, grazing and ranching by 6 percent, and mineral exploration/mining by less than 1 percent. Overall, protective strategies made up 76 percent of the preferred management strategies and commodity-based strategies 23 percent. This same trend is evident for the second and third most stated	This is an article on the values of newcomers to the west. Please see our response #224-4 and #224-20.

	preferences. These findings also contradict the longstanding view of the Federal lands as a public warehouse of commodities to be harvested and jobs to be filled. For newcomers in the rural West, the value of these public lands is related to protecting and preserving them."	
Artley, Dick	"Once clear-cutting has occurred, regulation and human silvicultural practices become responsible for the revegetation that follows. The creation of new forest succession patterns are the result of human control over the growing environment. Rather than proceeding at a natural pace, humans attempt to speed up the forest succession process to quickly return to a situation where harvesting is again possible. Reforestation of the disturbed area after clear-cutting also emphasizes maintaining control over the distribution and quality of forest species. Simplification is a state that results from the forest being harvested before it reaches maturity. Logging simplifies forest ecosystems (Dudley et al 1995) by narrowing the age range of the stand and suppressing diversification through repeated harvesting, burning to remove slash, and replanting with hybrid seedlings. Simplification affects the health and productivity of the forest because simplified forests lack the variety found in older stands, including species diversity, vertical structure, and microhabitat. From an ecological standpoint, a simplified forest of a particular age has less overall bio-mass per acre than a natural forest of the same age, but a simplified forest produces a higher volume of merchantable timber.	Please see our response #224-41.
Artley, Dick	"Within this volatile atmosphere the Bush Administration presented a new proposal for fire prevention called the "Healthy Forest Initiative." The plan received wide coverage in the national media in August and September 2002 and continues to be at the center of an attempt to significantly shift public land management in the United States. At the core of the plan is an effort to create private sector incentives to promote logging/thinning projects in the national forests."	This is an opinion article. Please see our response to #224-4.
Artley, Dick	"Logging on the National Forests provides less than 5% of the nation's timber supply, but costs the taxpayers more than 1 billion dollars in subsidies every year. Nor is logging a good job provider compared to recreation, which by Forest Service estimates provides	This is an opinion paper regarding timber supply, subsidies and societal benefits when compared to other non-timber economic contributors. Please see our response to #224-4.

	over 30 times the economic benefits of logging. These forests are the last remnants of the virgin forests that covered the country, and now have far more value as forest ecosystems, watershed/water supply protection, and recreational assets than for logging. In fact, the justification for the Weeks Act in 1911 which established national forests in the east, was watershed protection. (A major barrier to the Forest Service changing its ways is that these increased recreational economic benefits flow into the local economy, not to the Forest Service itself, whereas extractive uses of the national forests contribute directly to Forest Service budgets.) "Our nation is engaged in a great debate over the real purpose of our national forests, with the weight of public opinion swinging more and more strongly toward preservation. Certainly this nation should not be subsidizing logging when it is clear that we understand so little about the functioning of these enormously complex and ancient forest ecosystems that provide millions of people with clean air and water, as well as homes for a myriad of plants and wildlife that can live nowhere else."	
Artley, Dick	"Timber harvesting in British Columbia influences (a) forest hydrology; (b) fluvial geomorphology; (c) terrain stability; and (d) integrated watershed behavior. Impacts on forest hydrology are well understood and include increased average runoff, total water yield, increased storm runoff and advances in timing of floods. Stream channels and valley floors are impacted differently by fine sediment, coarse sediment and large woody debris transport. Terrain stability is influenced through gully and mass movement processes that are accelerated by timber harvesting. Impacts on integrated watershed behavior are assessed through disturbed sediment budgets and lake sediments."	This study was conducted in British Columbia, and has different environmental and climatic conditions, different tree species, and different timber harvesting levels and protocols than the 4FRI project area. Impacts to soils and watershed are addressed in response #224-42.
Artley, Dick	"In sum, 100 years of fire suppression and logging have created conditions that threaten central Oregon's natural resources and communities." "Thus it is inexplicable that the solution proposed by President Bush and some members of Congress emphasizes fire suppression and commercial logging, the very practices that created today's crisis. The federal government continues to attempt to suppress over 99% of all wildland fires. The Forest Service continues to measure its success not in terms of ecosystems restored, but in	This is a position paper regarding environmental policy. Please see our response to #224-4. Additionally, this is not a fuels (HFRA) project, nor are the ecosystems of Oregon an appropriate proxy for the 4FRI area proposed for treatment. See response to #224-49 in regards to fuels treatments vs. restoration treatments. Note: The link is broken, and the reference was not available.

	fires put out. The President's Healthy Forest Initiative, as embodied in H.R. 1904, promotes commercial logging at the expense of citizen participation and oversight of the forests we own."	
Artley, Dick	"Fire, just like insects and disease, are a natural and beneficial part of forest ecosystems and watersheds. Without these natural processes the forest ecosystems quickly degrade. Excessive logging removes and reduces cooling shade adding to the hotter, drier forests along with logging debris creating a more flammable forest. Current "forest management" practices, road building and development cause forest fires to rage for hundreds of miles. The Sierra Nevada Ecosystem Project said in a report to the U.S. Congress that timber harvests have increased fire severity more than any other recent human activity. Logging, especially clear cutting, can change the fire climate so that fires start more easily, spread faster, further, and burn hotter causing much more devastation than a fire ignited and burned under natural conditions. If we stop the logging and stop building fire prone developments, we minimize the loss of lives and property suffered by people in fires. As long as the people of America let politicians, timber executives, and the Forest Service get away with it - it will not stop. Those corporations that profit will continue to lie, cheat and steal to continue to make more money from our losses. Just like big tobacco."	This is an opinion paper regarding environmental policy. The purpose and need of the 4FRI project supports returning natural processes to the landscape. The DEIS describes the environmental consequences for affected resources on page 105 to page 331. The effects to fire behavior are summarized in the DEIS in table 4. The fire behavior effects have been updated in the FEIS.
Artley, Dick	"The agency's commercial timber program can contribute to the risk and severity of wildfire in the National Forests, yet Congress devotes nearly one-third of the Forest Service's entire budget to this wasteful program." (pg. 1) "Do not utilize the commercial timber program to reduce the risk of fire. Commercial incentives undercut forest health objectives and can actually increase the risk of fire." (pg. 9) "Commercial logging, especially of larger, fire-resistant trees, in the National Forests is one of several factors contributing to the risk and severity of wildfire." (pg. 19) "Commercial logging and logging roads open the forest canopy, which can have two effects. First, it allows direct sunlight to reach the forest floor, leading to increased evaporation and drier forests.5 As a consequence, ground fuels (grass, leaves, needles, twigs, etc.) dry out more quickly and become susceptible to fire. Second, an open canopy allows more sunlight to reach the understory trees, increasing their growth.6 This can lead to	This is a position, opinion paper regarding environmental policy. Please see our response to #224-4 and #224-62.

	weaker, more densely-packed forests." (pgs. 19-20) "Congress and the Forest Service continue to rely on the commercial logging program to do something it will never accomplish - reduce fire risk. The commercial logging program is designed to provide trees to private timber companies, not to reduce the risk of fire." (pg. 20)	This is a position, opinion paper regarding environmental policy. Please see our response to #224-4.Specific to the topic addressed, please see the following references supporting the use of thinning to mitigate potential fire behavior and effects see the sample of supporting references listed in response #224-36.“…canopy fuel treatments reduce the potential for crown fire at the expense of slightly increased surface fire spread rate and intensity. However, critical levels of fire behavior (limit of manual or mechanical control) are less likely to be reached in stands treated to withstand crown fires, as all crown fires are uncontrollable. Though surface intensity may be increased after treatment, a fire that remains on the surface beneath a timber stand is generally controllable.” (Scott 2003) “Encouraging the growth of brush” – only in the continued absence of fire. Decreased canopy cover decreases the production of needle litter and coarse woody debris. While these fuels are not flashy, they have a longer residence time and greater potential to do damage to soils and whatever herbaceous surface vegetation has been able to survive the shade produced by the closed canopy. In ponderosa pine, the majority of surface fuels should be herbaceous. These fuels are ‘flashy’, meaning they ignite readily, but burn up quickly. See pages 32 – 41 of the DEIS for a description of the historic fire regime in the ponderosa pine in the area proposed for treatment under the 4FRI.See ‘Chapter 1 – Purpose and Need for Action’ in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative. Treatments were based on site-specific restoration needs.
Artley, Dick	"Indiscriminate logging is not a viable solution to reducing wildfire risk. Logging can actually increase fire danger by leaving flammable debris on the forest floor. Loss of tree canopy lets the sun in, encouraging the growth of brush, increases wind speed and air temperature, and decreases the humidity in the forest, making fire conditions even worse."	Timber harvest is not an objective of the 4FRI. See ‘Chapter 1 – Purpose and Need for Action’ in the DEIS, pages 1 – 45, as well the following pages for details on the alternatives: 62 – 104. Table 31 (pages 96 – 104), is a detailed summary of each alternative. Treatments were based on site-specific restoration needs.
Artley, Dick	"Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity."(pg.62)	
Artley, Dick	"The development of sound forest-management policies requires	The socioeconomic analysis addresses non market values on page 14 of

	that consideration be given to the economic benefits associated with competing uses of forest resources. The benefits that may be provided under different management regimes include both use values (such as those provided by timber harvesting and recreation) and passive-use (or nonuse) values, including existence value, option value and quasi-option value. Many of these benefits are not revealed in market transactions, and thus cannot be inferred from conventional data on prices and costs."	the DEIS. The analysis states, “The economic value of Forest Service management is not entirely captured in market transactions. Much of the value of National Forests is “non-market” in nature – meaning that many of the benefits that forests provide to humans do not have a price. The lack of a price, however, should not be conflated with an absence of value. Indeed, non-market values from forests provide economic benefits to adjacent communities and forest visitors”… “Where appropriate, discussion of how the alternatives may affect non-market values will be presented. However, due to the qualitative nature of these discussions, direct comparisons between changes in market and non-market values are generally not possible”. The analysis includes economic inputs, an economic efficiency analysis and a social impacts analysis (DEIS, page 18-19).
Artley, Dick	"Unfortunately, there are number of massive logging proposals, disguised as hazardous fuels treatments, that have put environmentalists at odds with the Forest Service. Nearly all of these proposals focus primarily on the removal of mature and old-growth trees. These proposals continue even with overwhelming evidence that commercial logging is more of a problem than a solution. There's simply a cognitive disconnect between the Forest Service's scientists and its timber sale planners, whose budgets are dependent upon selling valuable mature trees. Ironically, this very type of logging, experts inform us, is likely to increase, not decrease, the frequency and severity of wildland fires. In the Forest Service's own National Fire Plan, agency scientists warned against the use of commercial logging to address fire management. The report found that 'the removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk.' "	The 4FRI is using restoration treatments based on soil, stand designation (habitat type, special uses), erosion potential, etc. ‘Commercial logging’ is not an objective of the 4FRI. Also see our response to #224-49.
Artley, Dick	"Another surprising finding is that mechanical fuels treatment, commonly known as logging and thinning, typically has little effect on the spread of wildfires. In fact, in some cases, it can increase wildfires' spread and severity by increasing the fine fuels on the ground (slash) and by opening the forest to greater wind and solar penetration, drying fuels faster than in unlogged forests."	An alternative that would have only utilized prescribed fire was considered but eliminated from detailed study because: (1) fire risk would remain high and there would be no improvement in terms of resiliency in and around MSO PACs; (2) treatment on 194,804 acres or 33 percent of the treatment area would likely be deferred in order to avoid a further reduction in pre-settlement trees; (3) movement toward having a sustainable forest structure with age and size class diversity would not be met as there would be continued overrepresentation in the VSS 3 and 4 age classes and continued underrepresentation in the

		VSS 5 and VSS 6 age classes; (4) forest structure and pattern and overall function would not be restored on 11,230 acres of grasslands and 45,469 acres of historic mollic-integrade savanna; and (5) movement toward the desired condition of restoring the historic pattern within the pine-sage mosaic would not be achieved in areas where treatment was deferred (DEIS, pp. 53-54). Table 31 of the DEIS indicates that the proposed treatments would meet the purpose and need reduce the potential for active crown fire from 34 percent to 10 percent or less.
Artley, Dick	"Logging equipment compacts soils. Logging removes biomass critical to future soil productivity of the forest. Logging disturbs sensitive wildlife. Logging typically requires roads and skid trails which create chronic sources of sedimentation that degrades water quality and aquatic organism habitat. Logging roads and skid trails are also a major vector for the spread of weeds. Logging disrupts nutrient cycling and flows. Logging can alter species composition and age structure (i.e. loss of old growth). Logging can alter fire regimes. Logging can change water cycling and water balance in a drainage. The litany of negative impacts is much longer, but suffice it to say that anyone who suggests that logging is a benefit or benign is not doing a full accounting of costs." Those who suggest that logging "benefits" the forest ecosystem are using very narrow definitions of "benefit." Much as some might claim that smoking helps people to lose weight and is a "benefit" of smoking."	Please see our response to #224-4.
Artley, Dick	"After logging, peak pipeflow was about 3.7 times greater than before logging." "The use of heavy logging equipment was expected to compact the soil, reduce infiltration rates, and increase surface runoff. In addition, heavy equipment might collapse some of the subsurface pipes, increasing local pore water pressure and the chance of landslides (Sidle, 1986)."	Please see our response to #224-2.
Artley, Dick	"As conservation-minded scientists with many years of experience in biological sciences and ecology, we are writing to bring your attention to the need to protect our National Forests. Logging our National Forests has not only degraded increasingly rare and valuable habitat, but also numerous other services such as recreation and clean water." "Unfortunately, the past emphasis of management has been on logging and the original vision for our National Forests has failed to be fully realized. During the past several decades, our	Thank you for your comment. Please see our response to comment #224-4.

Artley, Dick	National Forests have suffered from intense commercial logging. Today almost all of our old growth forests are gone and the timber industry has turned our National Forests into a patchwork of clearcuts, logging roads, and devastated habitat." "It is now widely recognized that commercial logging has damaged ecosystem health, clean water, and recreational opportunities-- values that are highly appreciated by the American public. The continued logging of our National Forests also wastes American tax dollars and diminishes the possibilities of future economic benefits. The Forest Service and independent economists have estimated that timber accounts for only 2.7 percent of the total values of goods and services derived from the National Forests, while recreation and fish and wildlife produce 84.6 percent." The Responsible Official ignores the statements of 221 unbiased, highly educated biological scientists who point out the common natural resource degradation resulting from commercial timber sales based on the word of a handful of foresters and silviculturists who will gain personally when the timber sale is sold. Clearly, the Responsible Official prefers to let representatives from resource extraction corporations choose the projects on the forest.	Thank you for your comment. Please see our response to comment #224-4.
Artley, Dick	"Recently, so called "salvage" logging has increased on national forests in response to a timber industry invented "forest health crisis" which points the finger at normal forest processes of fire, fungi, bacteria, insects and other diseases. In fact the crisis in the national forests is habitat destruction caused by too much clearcutting. My long-term studies of forest diseases in Idaho show the loss by disease and insect activity in all age classes of forests to be less than or slightly more than 1 percent per year over the past thirty-eight years. These findings are consistent with Forest Service national level data. Forests are structured systems of many life forms interacting in intricate ways and disturbances are essential to their functioning. It's not fire disease fungi bacteria and insects that are threatening the well being of forests. Disease, fire, windthrow, and other disturbances are a natural part of the forest ecosystem and assist in dynamic processes such as succession that are essential to long term ecosystem maintenance. The real threat facing forests are excessive logging, clearcutting and roadbuilding that homogenize	This is a position, opinion paper regarding environmental policy. Please see our response to #224-4. In addition, 4FRI is not proposing any clearcutting treatments within the project area.

	and destroy soil, watersheds and biodiversity of native forests."	
Artley, Dick	"CONCLUSIONS In our overview of the impacts of forest management activities on soil erosion and productivity, we show that erosion alone is seldom the cause of greatly reduced site productivity. However, erosion, in combination with other site factors, works to degrade productivity on the scale of decades and centuries. Extreme disturbances, such as wildfire or tractor logging, cause the loss of nutrients, mycorrhizae, and organic matter. These combined losses reduce long-term site productivity and may lead to sustained periods of extended erosion that could exacerbate degradation. Managers should be concerned with harvesting impacts, site preparation disturbances, amount of tree that is removed, and the accumulation of fuel from fire suppression. On erosion-sensitive sites, we need to carefully evaluate such management factors."	Please see response #224-2.
Artley, Dick	"Intensified forest management, responding to the ever-increasing demand for forest products, will have a strong influence on the amount and distribution of woody material that remains as wildlife habitat through present and future stand rotations. Leaving the perpetuation of large down material to chance will probably result in its disappearance from the managed forests of the future, along with the loss of dependent plant and wildlife species."	http://www.fs.usda.gov/detail/r6/landmanagement/resourcemanagement/?cid=fsbdev2_026700The link above will take you to the actual article. Animal Inn is an environmental education program for children and adults that provides readers basic facts about the origin and benefits of snags and decomposing logs. The 4FRI environmental analysis acknowledges the importance of snags and large down material, and states it will “retain key habitat components such as snags and large downed logs” (4FRI DEIS p505). The 4FRI DEIS also discloses the importance of insects at endemic levels (DEIS, p24) snags and course wood debris (CWD) (desired conditions for snags and CWD are listed in table 6 p 13 and table 7, p 14 of the DEIS) for health of a forest. Also, please see specialist’s reports on Soil/Water, Wildlife, Silviculture, and Fire Ecology. The DEIS and all these reports are available on the web at: http://www.fs.usda.gov/main/4fri/home
Artley, Dick	"Wuerthner has long argued that dead trees are critical to a healthy forest ecosystem and don't necessarily need to be removed from a forest to lessen the danger of catastrophic wildfires." "Wuerthner said logging as a preventive measure might slow down the infestation, but research shows that anywhere from 50 to 80 percent of the trees need to be removed if conditions are ripe for a major attack. " "So you have to ask yourself, what's the point? That is the Vietnam approach to forestry - kill all the trees so you can 'save'	This is an opinion piece in a newspaper. Neither the author, nor the quoted speaker (George Wuerthner) provides any peer-reviewed literature to substantiate that “50 to 80 percent of the trees need to be removed if conditions are ripe for a major attack.” In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider.

	them," Wuerthner wrote, adding that logging isn't benign and is expensive. "So you further have to ask whether the costs in terms of ecosystem impacts (the spread of weeds on logging roads for instance) are worth the presumed benefits." "	
Artley, Dick	"When many of us think of a healthy forest, we think of tall, green trees. It's hard to imagine how a tree killed by mountain pine beetle could be good for a forest. However, to be truly healthy and support all the wildlife that depends on it, there must be a variety of young, old and dead trees in a forest ecosystem. At "endemic" or normal levels, mountain pine beetles help maintain this diversity by colonizing and killing old or damaged trees, therefore kick-starting the invaluable process of decomposition. Decomposing wood returns nutrients to the system while providing shelter and food for many plants and animals. Standing dead trees host a diversity of organisms that would not be present without them."	This is an educational website from the Canadian Parks service that covers the ecological food web. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. With that being said, the 4FRI DEIS does recognize the importance of insects at endemic levels (DEIS, p24) snags and course wood debris (CWD) (desired conditions for snags and CWD are listed in table 6 p 13 and table 7, p 14 of the DEIS) for health of a forest.
Artley, Dick	"Things are not always what they seem. At first glance a dead or dying tree seems like a tragic loss of a valuable resource. But on further inspection it becomes clear that a dead tree is simply a part of nature. And as a part of nature it serves an important purpose that isn't always obvious to us. Dead trees and dead parts of trees are critically important to birds and mammals for nesting, rearing of young, feeding and as shelter. With a little forethought and tolerance we can maintain our organized, structured lifestyle and at the same time provide wildlife the habitat it needs to survive. In the long run, we'll be the better for it."	This quote is from a 1994 blog post aimed at urban and rural residents to educate them about the value of dead and dying trees in North Dakota. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. With that being said, the 4FRI DEIS does recognize the importance snags (desired conditions for snags are listed in table 6 p 13 and table 7, p 14 of the DEIS) for health of a forest.
Artley, Dick	"The forest floor is a living, breathing factory of life and death. The out-reaching roots of a great tree search out from that chemical stew we call soil not only moisture but those elements it needs while its solar panels, or leaves, exchange carbon dioxide and oxygen. Years later, when this aged giant completes its cycle and falls, crashing to earth, those very organisms and creatures which sustained it in life will gradually disassemble its biomass, returning to the soil those molecules which the next generation of seedlings, already sprouting, require for sustenance." "Forest biologists such as Herbert Kronzucker, Ph.D., point out that dead and dying trees sustain the coming generations, are not a hazard, and are essential to the health of the forest." Alaskan fire management official John LeClair has	The newspaper article from 1998 concerns removal of non-native trees by the Marin (CA) Marin Municipal Water District watershed. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. With that being said, the 4FRI DEIS does recognize the importance of insects at endemic levels (DEIS, p24) snags and course wood debris (CWD) (desired conditions for snags and CWD are listed in table 6 p 13 and table 7, p 14 of the DEIS) for health of a forest.

	noted that dead trees left standing, rather than increasing the hazard of fires, burned more slowly, retarding the conflagration in contrast to the "explosive inferno" when a live tree full of inflammable resins caught fire."	
Artley, Dick	"Dead and down woody materials have long been viewed by foresters as unsalvaged mortality, the utilization of which is an important objective of good timber management. This material is also viewed as a fire hazard, and steps are frequently taken to reduce the amount of flashy fuels from timber harvest areas. Woody materials are also recognized as home for small vertebrate animals that are considered "pests" which impede reforestation. These are all valid considerations, but dead and down woody material in various stages of decay serves many important functions, one of which is habitat for wildlife. Instead of viewing logs left in a forest as unsalvaged mortality or a fire hazard, this chapter examines their role as wildlife habitat. Elton (1966, p. 279) put it this way: When one walks through the rather dull and tidy woodlands--say in the managed portions of the New Forest in Hampshire [England]-that result from modern forestry practices, it is difficult to believe that dying and dead wood provides one of the two or three greatest resources for animal species in a natural forest, and that if fallen timber and slightly decayed trees are removed the whole system is gravely impoverished of perhaps more than a fifth of its fauna."	http://www.fs.usda.gov/detail/r6/landmanagement/resourcemanagement/?cid=fsbdev2_027092The correct link to the article is shown above. Please see the response to #222-1.
Artley, Dick	"Cavity trees are dead or dying trees that contain one or more holes or cavities that could be used by wildlife for a variety of purposes - nesting and raising young, denning, roosting, resting, feeding, caching food, escaping predators and hibernating." "The majority of wildlife species that use cavities cannot excavate their own holes and rely on those created by primary cavity users or on holes that form naturally. This group is called secondary cavity users. The kestrel, some owls such as the saw-whet and barred owls, ducks such as the common goldeneye and wood duck, and songbirds like the eastern bluebird, great-crested flycatcher and white-breasted nuthatch are all secondary cavity users. Many mammals are in this category too. These include deer mice, red squirrels, grey squirrels, flying squirrels, weasels, martens, fishers, raccoons, porcupines and black bears."	This is educational article aimed at private foresters in Ontario, Canada. In order for comments to result in improved analysis and decisions, they need to be within the scope of the project, relevant to the project and have a direct relationship to the proposed actions. We could not find meaningful recommendations or comments for the Responsible Official to consider. With that being said, With that being said, the 4FRI DEIS does recognize the importance of snags (desired conditions for snags are listed in table 6 p 13 and table 7, p 14 of the DEIS) for health of a forest. The wildlife section of Chapter 3 and the wildlife specialist report of the DEIS also discloses the effects of proposed actions on cavity nesting species.
Artley, Dick	"Dead wood and dead trees provide essential habitat for a wide	We agree that logs and other coarse woody debris (CWD) are important

Artley, Dick	variety of native animals and are important to the functioning of many ecosystems. The removal of dead wood can have a range of environmental consequences, including the loss of habitat (as they often contain hollows used for shelter by animals), disruption of ecosystem process and soil erosion." "Removal of dead old trees (either standing or on the ground) results in the loss of important habitat such as hollows and decaying wood (Gibbons & Lindenmayer 2002) for a wide variety of vertebrates, invertebrates and microbial species and may adversely affect the following threatened species: Broad-headed Snake, Orange-bellied Parrot, Regent Parrot (eastern subspecies), Five-clawed Worm-skink, Nurus atlas, Nurus brevis, Meridolum corneovirens, Pale-headed Snake, Stephens' Banded Snake, Rosenberg's Goanna, Pink Cockatoo, Red-tailed Black-cockatoo, Glossy Black-cockatoo, Turquoise Parrot, Scarlet-chested Parrot, Barking Owl, Superb Parrot, Masked Owl, Hoary Wattled Bat, Spotted-tailed Quoll, Eastern False Pipistrelle, Eastern Freetail-bat, Squirrel Glider, Brush-tailed Phascogale, Glandular Frog, Red-crowned Toadlet, Brown Treecreeper (eastern subspecies)." "Birds are the most obvious benefactors of dead trees. They use snags, limbs, and logs for perching, foraging, and nesting. In some forests, 30 to 45 percent of the bird species are cavity nesters. In North America alone, 55 avian species nest in cavities. Cavity-nesting birds are classified as primary excavators (who can excavate hard wood), weak excavators (who can excavate soft, dead wood), or secondary cavity-users (who can utilize existing cavities). In Ohio, eastern bluebirds, American kestrels, and wood ducks are examples of species that rely on cavities in dead wood for successful reproduction. Other birds, such as ruffed grouse, will use logs for drumming and courtship displays. However, birds are not the only creatures that benefit from dead wood. Mammals, amphibians, reptiles, and invertebrates seek refuge in natural cavities and dens. For example, salamanders rely on the security and dampness of soil found beneath a rotting log. Small mammals find cover and relief from the hot midday sun in dead limbs and downed wood, while spiders, beetles, worms, and microbes move and feed within the decaying matter. Additionally, fungi and mushrooms flourish on and around logs, breaking down the organic matter to release important	Please see the response to #222-8.

	nutrients back into the forest ecosystem. Logs provide other important ecological functions as well. Decaying logs retain moisture and nutrients that aid in new plant growth. Young trees may sprout from a single downed limb known as a nurse log. The soft wood tissue of a nurse log offers an ideal substrate for many young trees during their initial growth and development. Logs also store energy and fix nitrogen. Furthermore, dead wood serves as a ground cover, lessening soil erosion and preventing animals such as deer from over-browsing plant seedlings." "Wildlife trees (dead or dying trees used for nesting, feeding, denning and roosting) go through several stages that can start with ants tunneling into the rotting centre to flycatchers perching on the bare branches. For cavity-nesting birds they are critical habitat. Some species excavate cavities for their nests, while others take over and enlarge existing holes. Many of these birds in turn help the forest,	
Artley, Dick	eating insects which can damage trees."	Please see the response to #222-8.
	"Twenty years after publication of a report on wildlife habitat in managed east-side forests, Pacific Northwest Research Station scientists Evelyn Bull, Catherine Parks, and Torolf Torgersen, are updating that report and discovering that the current direction for providing wildlife habitat on public forest lands does not reflect findings from research since 1979. More snags and dead wood structures are required for foraging, denning, nesting, and roosting than previously thought. In this issue of Science Findings, Bull, Parks, and Torgersen, share their latest findings, which include the fact that snags and logs are colonized by organisms representing a broader array of plants, invertebrates, and vertebrates than was previously	The 4FRI environmental analysis concurs with this statement concerning the importance of snags and dead wood structures, and states it will "retain key habitat components such as snags and large downed logs (4FRI DEIS p505).Also, please see the response to #222-8 to find out how the 4FRI DEIS addressed this important issue. The effects of herbicide use were analyzed and disclosed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005). The 4FRI project tiers to this separate NEPA analysis. The Noxious or Invasive Weed EIS evaluated the impacts of glyphosate based herbicides and proposed restrictions on the use of these chemicals within limited spray zones (buffers around human habitation and recreation sites), near water and other critical wildlife habitat areas. These restrictions and extra protective measures are outlined in the Appendix B - Design Features, Best Management
Artley, Dick	recognized."	
	When dealing with health issues like this that involve the unaware public it's better to be safe than sorry. As the Responsible Official please do not direct your staff to prepare denial or 'it doesn't apply to this project" statements. Most reasonable managers would not take the chance of killing someone even if the probability of it	
Artley, Dick	occurring were low. Are you ready to take this risk?	

	There are laws against deceiving the public by withholding the information describing the adverse effects of proposed projects so the line-officer might carry out the agency's timber agenda. I'll point out these laws in my appeal if the final NEPA document does not cite some of the source literature for the opposing views below. To do this the source literature must be included in the References section	
Artley, Dick	of the final NEPA document.	
	Opposing Views Attachment #11 ANY NEPA Document that Analyzes Treatments to Reduce the Risk of Fire Damage to Homes Located in the WUI must Analyze a Dr. Jack Cohen Alternative in Detail. Dr. Cohen's background Dr. Jack Cohen is a research fire physicist who does his research in the Forest Service's Missoula Fire Sciences Laboratory at the Rocky Mountain Research Station. Dr. Cohen is a Forest Service employee. His research findings clearly show that commercial logging to reduce fuels will not protect homes from wildfire damage in the Wildland Urban Interface (WUI). Dr. Cohen's Research Findings Represent Best Science and Empirical Evidence Shows his Fire Damage Risk Reduction Methods that remove the Fine Fuels Near the Home are Far Superior to Hazardous Fuel Removal Dr. Cohen Is likely the only Ph.D. fire physicist in America who specializes in determining the best actions to reduce the risk of wildfire damage to homes. Dr. Cohen is a well published scientist-author. He has published 12 peer-reviewed scientific papers summarizing his	
Artley, Dick	research findings.	

Practices, Required Protection Measures, and Mitigation Measures of the weed EIS. BMP B15 (page 570 of 4FRI DEIS) incorporates the weeds mitigation measures (appendix B of the weed EIS) in their entirety. Any unavoidable adverse effects resulting from implementation of each of the action alternatives (B, C and D) on soil, water and vegetation resources may be found starting on page 330 of the DEIS. The analysis performed by the resource specialists determined that through the use of resource protection measures such as design features, BMPs, and mitigation, there would be no unavoidable adverse effects to soil and water resources, or forest vegetation and timber resources. There would be only short-term effects from prescribed fire on MSO individuals. For MIS, such as Abert's and tassel-eared squirrels, there is likely to be a short-term decrease in habitat quantity and quality, though both would increase in the long-term. Visual disturbance from restoration activities would lower the scenic quality of the area in the short-term (1 to 5 years).There would be a short-term and temporary decrease in recreation opportunities from logging activities.
(221-18) All opposing views are addressed in this specific response. The multiple references to the work of Jack Cohen (Cohen 1996-2001, 2003, 2008) and related papers were considered. Cohen's research generally addresses concerns about structure protection, as evidenced by the titles of the 9 Cohen papers referenced by the commenter: Reducing the Wildland Fire Threat to Homes: Where and How Much (1999)Examination of the Home Destruction in Los Alamos Associated with the Cerro Grande Fire (2000)Preventing Disaster – Home Ignitability in theWildland-Urban Interface (2000)What is the Wildland Fire Threat to Homes?(2000)Thoughts on the Wildland-Urban Interface Fire Problem (2003)The Wildland-Urban Interface Fire Problem: A Consequence of the Fire Exclusion Paradigm (2008)Modeling Potential Structure Ignitions from Flame Radiation Exposure with Implications for Wildland/Urban Interface Fire Management (1996)Structure Ignition Assessment Can Help Reduce Fire Damages in the W-UI (1997)Saving Homes from Wildfires: Regulating the Home Ignition Zone (2001)We reviewed all these papers and found the relevancy in these papers was limited to that portion of the 4FRI treatments (~535 acres) that have a fuels/WUI focus, and how that treatment would be expected to decrease the intensity of a wildfire approaching a WUI area. On those

		~535 acres where the proposed treatments are actually fuels treatments, the treatments proposed align with the suggestions here that 'fuels treatments' should focus on creating conditions in which fire can occur without devastating consequences, rather than on creating conditions conducive to fire suppression. There was no new information or information that could otherwise inform the analysis. In summary, treating only WUI areas would not meet the purpose and need for restoration and the request to create an alternative was considered to be beyond the scope of the 4FRI and not reasonable enough to warrant alternative development.
Artley, Dick	Independent Sources Emphasize the Effectiveness of Dr. Cohen's Fire Damage Risk Reduction Methods "Homeowners are their own first line of defense. Saving a home from wildfire depends primarily on two factors: roofing material and the quality of the "defensible space" surrounding it.8 Research Physical Scientist Jack Cohen noted after visiting homes that survived the Rodeo-Chediski Fire and those that were consumed, that had homeowners followed guidelines for creating defensible space-described as creating an area around a structure where fuels and vegetation are treated, cleared, or reduced to slow the spread of fire-more homes would have survived." Fact Sheet: Understanding Fire and Fire Behavior Ontario Aviation and Forest Fire Management http://www.emifpa.org/PDF/FactSheetUnderstandingFire.pdf ---------- Dr. Cohen's opposing view #1 - "Research results indicate that the home and its immediate surroundings within 100-200 feet (30-60 meters) principally determines the home ignition potential during severe wildland-urban fires. Research has also established that fire is an intrinsic ecological process of nearly all North American ecosystems. Together, this understanding forms the basis for a compelling argument for a different approach to addressing the wildland-urban fire problem." (Pg. 1 - abstract) Source: Wildland-Urban Fire-A different approach http://www.nps.gov/fire/download/pub_pub_wildlandurbanfire.pdf ---------- Dr. Cohen's opposing view #2 - "A senior physicist at the Stanford Research Institute, C.P. Butler (1974), coined the term "urban-wildland interface" and described this fire problem as follows: "In its simplest terms, the fire interface is any	(221-19) See response 221-18.

point where the fuel feeding a wildfire changes from natural (wildland) fuel to man-made (urban) fuel." (Pg. 1) Dr. Cohen's opposing view #3 - "The results of the diverse analytical methods are congruent and consistently indicate that ignitions from flames occur over relatively short distances--tens of meters not hundreds of meters. The severe-case estimate of SIAM indicates distances of 40 meters or less. Experimental wood walls did not ignite at 10 meters when exposed to experimental crown fires. And, case studies found that vegetation clearance of at least 10 meters was associated with a high occurrence of home survival." (Pg. 4) Dr. Cohen's opposing view #4 - "Analyses of southern California home losses done by the Stanford Research Institute for the 1961 Belair-Brentwood Fire (Howard and others 1973) and by the University of California, Berkeley, for the 1990 Painted Cave Fire (Foote and Gilless 1996) are consistent with SIAM estimates and the experimental crown fire data. Given nonflammable roofs, Stanford Research Institute (Howard and others 1973) found a 95 percent survival with a clearance of 10 to 18 meters and Foote and Gilless (1996) at Berkeley, found 86 percent home survival with a clearance of 10 meters or more." (Pgs. 3 and 4) Dr. Cohen's opposing view #5 - "Extensive wildland vegetation management does not effectively change home ignitability." (Pg. 5) Dr. Cohen's opposing view #6 - "Home ignitability also dictates that effective mitigating actions focus on the home and its immediate surroundings rather than on extensive wildland fuel management. Because homeowners typically assert their authority for the home and its immediate surroundings, the responsibility for effectively reducing home ignitability can only reside with the property owner rather than wildland agencies." (Pg. 5) Dr. Cohen's opposing view #7 - "As stated, the evidence indicates that home ignitions depend on the home materials and design and only those flammables within a few tens of meters of the home (home ignitability). The wildland fuel characteristics beyond the home site have little if any significance to WUI home fire losses." (Pg. 5) Dr. Cohen's opposing view #8 - "Home ignitability implies that homeowners have the ultimate responsibility for WUI home fire loss potential. As shown, the ignition and flammability characteristics of a structure and its immediate surroundings determine the home fire

	loss potential. Thus, the home should not be considered a victim of wildland fire, but rather a potential participant in the continuation of the wildland fire. Home ignitability, i.e., the potential for WUI home fire loss, is the homeowner's choice and responsibility." (Pg. 5) Dr. Cohen's opposing view #9 - "However, public and management perceptions may impede homeowners from taking principal responsibility. For example, the Federal Wildland Fire Management, Policy and Program Review (1995) observes, 'There is a widespread misconception by elected officials, agency managers, and the public that wildland/urban interface protection is solely a fire service concern.' In a Journal of Forestry article, Beebe and Omi (1993) concur, stating that, 'Public reaction to wildfire suggests that many Americans want competent professionals to manage fire flawlessly, reducing the risks to life, property, and public lands to nil.' These statements agree with Bradshaw's (1988) description of the societal roles in the WUI problem. He observes that homeowners expect that fire protection will be provided by others. Contrary to these expectations for fire protection, the fire services have neither the resources for effectively protecting highly ignitable homes during severe WUI fires, nor the authority to reduce home ignitability." (Pg. 6) Source: Reducing the Wildland Fire Threat to Homes: Where and How Much? Presented as the Fire Economics Symposium in San Diego, California on April 12, 1999. http://www.fs.fed.us/rm/pubs_other/rmrs_1999_cohen_j001.pdf Dr. Cohen's opposing view #10 - "Vegetation management beyond the structure's immediate vicinity has little effect on structure ignitions. That is, vegetation management adjacent to the structure would prevent ignitions from flame exposure; but vegetation management away from the structure would not affect ignition from flame exposure and would not significantly reduce ignitions from firebrands." (Pg. 4) Dr. Cohen's opposing view #11 - "Past reports and recommendations as well as experimental research and modeling suggest that W-UI fire-loss mitigation should concentrate on the residence and its immediate surroundings. Any strategy for effectively reducing the W-UI fire problem must initially focus on residential fire resistance." (Pg. 5 - Conclusion) Dr. Cohen's opposing	
Artley, Dick	view #12 - "Instead of all fire protection responsibilities residing with	(221-20) See response 221-18.

fire agencies, homeowners take responsibility for assuring firewise conditions and the initial fire defense of their residences during wildland fires. The fire agencies become a community partner that provides information, coordinates and assists in meeting firewise requirements, and provides fire suppression assistance." (Pg. 5) Source: Structure Ignition Assessment can Help Reduce Fire Damages in the WUI Published in Fire Management Notes, Volume 57 No. 4, 1997 http://www.fs.fed.us/rm/pubs_other/rmrs_1997_cohen_j001.pdf ---------- Dr. Cohen's opposing view #13 - "My examination suggests that the abundance and ubiquity of pine needles, dead leaves, cured vegetation, flammable shrubs, wood piles, etc. adjacent to, touching and or covering the homes principally contributed to the residential losses." (Pg. 4) Source: Examination of the Home Destruction in Los Alamos Associated with the Cerro Grande Fire July 10, 2000 Source: USDA Forest Service, Rocky Mountain Research Station, Missoula, Montana, 2000. http://www.fusee.org/docs/Preparedness/Cohen_examlosalamos%20copy.pdf ---------- Dr. Cohen's opposing view #14 - "The wildland fire management approach for preventing WUI fire disasters largely addresses the wildfire outside the home ignition zone rather than a home's ignition potential as determined by the conditions within the home ignition zone. Since 2000, agency fire management policy initiatives have emphasized fire suppression." (Pg. 24) Dr. Cohen's opposing view #15 - "Preventing WUI fire disasters requires that the problem be framed in terms of home ignition potential. Because this principally involves the home ignition zone, and the home ignition zone primarily falls within private ownership, the responsibility for preventing home ignitions largely falls within the authority of the property owner. Preventing wildfire disasters thus means fire agencies helping property owners mitigate the vulnerability of their structures. The continued fire management focus on fire suppression suggests the WUI fire problem persists largely as a consequence of framing the WUI fire problem primarily in terms of the fire exclusion paradigm." (Pg. 25) Dr. Cohen's opposing view #16 - "The continued focus on fire suppression largely to the exclusion of alternatives that address home ignition potential

suggests a persistent inappropriate framing of the WUI fire problem in terms of the fire exclusion paradigm." (Pg. 25) Source: The Wildland-Urban Interface Fire Problem: A Consequence of the Fire Exclusion Paradigm Published in Forest History Today, Fall 2008 http://www.foresthistory.org/Publications/FHT/FHTFall2008/Cohen.pdf ---------- Dr. Cohen's opposing view #17 - "For the same reason, mitigating home ignition potential during extreme wildland fires must focus activities within and immediate to the residential area, i.e. the home ignition zone. But the home ignition zone largely corresponds to private property. Thus, with minor exception, the authority for effectively reducing the home ignition potential belongs to homeowners. Public land management agencies can facilitate homeowner mitigations and these agencies may be able to reduce fire intensities and the extent of burning around communities. But these agencies cannot accomplish the necessary and sufficient actions necessary to prevent residential fire disasters during extreme fire conditions by treating beyond the home ignition zone." (Pg. 2) Source: Thoughts on the Wildland-Urban Interface Fire Problem, June 2003 http://www.nps.gov/fire/download/pub_pub_wildurbaninterface.pdf ---------- Dr. Cohen's opposing view #18 - "A home with its immediate surroundings (about 100-150 feet from the structure) is called the Home Ignition Zone. Many factors about the HIZ determine the potential for ignition during a wildland fire, such as flammable wood roofs and materials like trees, grass, decks, or adjacent structures leading up to a home." (Pg. 1) Source: Saving Homes from Wildfires: Regulating the Home Ignition Zone Published in Zoning News, May 2001 http://www.battle-creek.net/docs/fire/Zoning.pdf ---------- Dr. Cohen's opposing view #19 - "SIAM calculations indicate that large wildland flame fronts (e.g., forest crown fires) will not result in piloted wood ignitions (e.g., the typical variety of exterior wood walls) at distances greater than 40 meters (Cohen and Butler [In press])." (Pg. 4) Dr. Cohen's opposing view #20 - "Field studies conducted during the International Crown Fire Modeling Experiment (Alexander et al. 1998) provided measured data for comparisons with SIAM model estimates. Total heat transfer (radiation and convection)

and ignition data were obtained from heat flux sensors placed in wooden wall sections. The instrumented walls were located on flat, cleared terrain at 10, 20, and 30 meters downwind from the edge of the forested plots. The forest was variably composed of an overstory of jack pine (Pinus banksiana) about 13 meters high with an understory of black spruce (Picea mariana). The spreading crown fire produced flames approximately 20 meters high." (Pg. 5) Dr. Cohen's opposing view #21 - "Five burns were conducted where wall sections were exposed to a spreading crown fire. As the crown fires reached the downwind edge of the plot, turbulent flames extended into the clearing beyond the forest edge. In two of the five burns, flames extended beyond 10 meters to make contact with the wall section placed at 10 meters from the forest edge. When flame contact occurred, the walls ignited; however, without flame contact, only scorch occurred. The wooden panels at 20 and 30 meters never ignited and the panel at 30 meters never scorched." (Pg. 6) Dr. Cohen's opposing view #22 - "Case studies of actual W-UI fires provide an independent comparison with SIAM and the crown fire experiments. The actual fires incorporate a wide range of fire exposures. The case studies chosen examine significant factors related to home survival for two fires that destroyed hundreds of homes. The Bel Air fire resulted in 484 homes destroyed (Howard et al. 1973) and the Painted Cave fire destroyed 479 homes (Foote 1994). Analyses of both fires indicate that home ignitions depend on the characteristics of a home and its immediate surroundings. Howard et al. (1973) observed 95 percent survival for homes with nonflammable roofs and a vegetation clearance of 10 to 18 meters. Foote (1994) observed 86 percent survival for homes with nonflammable roofs and a clearance of 10 meters or more." (Pg. 7) Dr. Cohen's opposing view #23 - "The high survival rate for homes with nonflammable roofs and 10-20 meter vegetation clearances included firebrands as an ignition factor, thus indicating that firebrand ignitions also depend on the ignition characteristics of the home and the adjacent flammable materials." (Pg. 8) Dr. Cohen's opposing view #24 - "Wildland fuel reduction beyond the home ignition zone does not necessarily change home ignitability; therefore, wildland fuel reduction does not necessarily mitigate the

W-UI fire loss problem." (Pg. 9) Dr. Cohen's opposing view #25 - "Effective landscape fuel reduction does not necessarily prevent W-UI home fire destruction." (Pg. 10) Dr. Cohen's opposing view #26 - "Fire losses depend on home ignitions and home ignitions depend on home ignitability. Thus, home ignitability, being limited to a home and its immediate surroundings, offers us the opportunity to separate the W-UI structure fire loss problem from other landscape-scale fire management issues. This conclusion has significant implications for the actions and responsibilities of homeowners and fire agencies, such as identifying and mapping the potential for W-UI residential fire destruction, identifying appropriate and effective mitigating actions, and determining who should take responsibility for home ignitability." (Pg. 10) Dr. Cohen's opposing view #27 - "Thus, wildland fuel reduction that is effective for reducing the wildland fire intensity might be insufficient for reducing the destruction of highly ignitable homes. In contrast, a low home ignition potential reduces the chances of fire destruction without extensive wildland fuel reduction. These findings indicate that the W-UI home fire loss problem is a home ignitability issue largely independent of landscape fuel reduction issues." (Pg. 10) Dr. Cohen's opposing view #28 - "The extent of the home ignition zone corresponds more to specific home and community ownership than to the landscapes of federal, state and local land management agencies. This suggests a corresponding responsibility for W-UI home fire loss potential residing with homeowners and communities. Thus, the home should not be considered a victim of wildland fire, but rather a potential participant in the continuation of the wildland fire. Home ignitability, i.e., the potential for W-UI home fire loss, is a homeowner and community choice and responsibility." (Pg. 11) Source: What is the Wildland Fire Threat to Homes? Presented as the Thompson Memorial Lecture, April 10, 2000 http://www.nps.gov/fire/download/pub_pub_wildlandfirethreat.pdf ---------- Dr. Cohen's opposing view #29 - "Model results indicate that ignitions from flame radiation are unlikely to occur from burning vegetation beyond 40 meters of a structure. Thinning vegetation within 40 meters has a significant ignition mitigation effect." (Pg. 81) Dr. Cohen's opposing view #30 -

Artley, Dick	"Vegetation management to prevent ignitions from radiation does not require extensive vegetation removal hundreds of meters from a structure. Our analysis indicated that 40 meters was sufficient for a 20 meter flame height." (Pg. 86 - Conclusions) Source: Modeling Potential Structure Ignitions from Flame Radiation Exposure with Implications for Wildland/Urban Interface Fire Management Presented at the 13th Fire and Forest Meteorology Conference. Lorne, Australia, 1996 http://www.firewise.org/resources/files/WUI_HIR/Modelingpotentialignitions.pdf Dr. Cohen's opposing view #31 - "Miracles aside, the characteristics of the surviving home and its immediate surroundings greatly influenced its survival." (Pg. 15) Dr. Cohen's opposing view #32 - "Based on severe-case assumptions of flame radiation and exposure time, SIAM calculations indicate that wild-land flame fronts comparable to crowning and torching trees (flames 20 meters high and 50 meters wide) will not ignite wood surfaces at distances greater than 40 meters (Cohen and Butler, in press). Figure 2 shows the radiant heat a wall would receive from flames depending on its distance from the fire. The incident radiant heat flux, defined as the rate of radiant energy per unit area received at an exposed surface, decreases as the distance increases." (Pg. 17) Dr. Cohen's opposing view #33 - "Analyses of both fires indicate that home ignitions depend on the characteristics of a structure and its immediate surroundings. Howard et al. (1973) observed 86 percent survival for homes with nonflammable roofs and a clearance of 10 meters or more." (Pg. 19) Dr. Cohen's opposing view #34 - "Using the model results as guidance with the concurrence of experiments and case studies, we can conclude that home ignitions are not likely unless flames and firebrand ignitions occur within 40 meters of the structure. This finding indicates that the spatial scale determining home ignitions corresponds more to specific home and community sites than to the landscape scales of wildland fire management. Thus, the W-UI fire loss problem primarily depends on the home and its immediate site." (Pg.20) Dr. Cohen's opposing view #35 - "Thus, the W-UI fire loss problem can be defined as a home ignitability issue largely independent of wildland fuel management issues. This	(221-21) See response 221-18.

	conclusion has significant implications for the actions and responsibilities of homeowners and fire agencies, such as defining and locating potential W-UI fire problems (for example, hazard assessment and mapping), identifying appropriate mitigating actions, and determining who must take responsibility for home ignitability." (Pg.20) Dr. Cohen's opposing view #36 - "The W-UI fire case studies indicated approximately 90 percent survival with a vegetation clearance on the order of 10 to 20 meters for homes with nonflammable roofs. Thus, the case studies support the general flame-to-structure distance range of 10 to 40 meters as found through modeling and experiments." (Pg.20) Dr. Cohen's opposing view #37 - "A change needs to take place in the relationship between homeowners and the fire services. Instead of home-related presuppression and fire protection responsibilities residing solely with fire agencies, homeowners must take the principal responsibility for ensuring adequately low home ignitability." (Pg.21) Source: Preventing Disaster Home ignitability in the Wildland-Urban Interface Published in the Journal of Forestry 98(3): 15-21, 2000 http://www.nps.gov/fire/download/pub_pub_preventingdisaster.pdf ---------- Dr. Cohen's opposing view #38 - "Many scientists and natural resource agencies suggest extensive fuel treatments to reduce the possibility of severe and intense wildfires that could damage ecosystems, destroy property, and take human life (USDA Forest Service, 2000; GAO, 2003a,b). However, there are a number of misconceptions and misunderstandings about fuel treatments and their use as a panacea for fire hazard reduction across the United States (Finney and Cohen, 2003; Franklin and Agee, 2003)." (Pg.1998) Dr. Cohen's opposing view #39 - "Given the right conditions, wildlands will inevitably burn. It is a misconception to think that treating fuels can ''fire-proof'' important areas. It would be virtually impossible to exclude fire from most temperate terrestrial ecosystems because ignition sources are prevalent and fuels cannot be eliminated. Ignition is rarely affected by fuel treatment." (Pg.1998) Dr. Cohen's opposing view #40 - "Treating fuels to facilitate suppression is an example in circular logic. If fuel treatment	
Artley, Dick	makes suppression more successful in general, then less area will be	(221-22) See response 221-18.

burned in the short run and more acreage will tend to burn under extreme conditions, when suppression is ineffective. The inevitable result is that more area is burned in fewer, more unmanageable events with greater consequences. In addition, fire suppression leads to continued fuel accumulation and, in turn, more difficult conditions for suppression. This phenomenon has been described as ''the wildland fire paradox'' (Brown and Arno, 1991). Rather than creating conditions where fire is easier to suppress, fuel treatments should strive to create conditions where fire can occur without the need for suppression." (Pg.1998) Dr. Cohen's opposing view #41 - "Bessie and Johnson (1995) show weather (fuel moisture and wind) is far more important than fuels in determining fire behavior; reducing fuels may have a limited impact on fire occurrence." (Pg.1999) Dr. Cohen's opposing view #42 - "Treating fuels to reduce fire occurrence, fire size, or amount of burned area is ultimately both futile and counter-productive." (Pg.1999) Dr. Cohen's opposing view #43 - "Since the home ignition zone largely occurs on private lands, most land management agencies do not have the authority to mitigate the WUI ignition potential directly (Cohen, 2000b). However, the opportunity exists to explicitly define responsibilities for the WUI fire potential (i.e. the home ignition zone) consistent with areas of jurisdiction and separately from ecological wildfire issues." (Pg.1999) Dr. Cohen's opposing view #44 - "It may not be necessary or effective to treat fuels in adjacent areas in order to suppress fires before they reach homes; rather, it is the treatment of the fuels immediately proximate to the residences, and the degree to which the residential structures themselves can ignite that determine if the residences are vulnerable." (Pg.1999) Dr. Cohen's opposing view #45 - "WUI fuel treatments can be designed such that an extreme wildfire can occur in the WUI without having a residential fire disaster. Although general wildfire control efforts may not benefit from fuel treatments during extreme fire behavior, fuel modifications can significantly change outcome of a wildfire within a treatment area. Research has shown that a home's characteristics and its immediate surroundings principally determine the WUI ignition potential during extreme wildfire behavior (Cohen, 2000a,c, 2003, 2004). The area that primarily determines WUI ignition potential is called the home

	ignition zone (Cohen, 2001). WUI fuel treatments can address the home ignition zone by removing flammable materials immediately adjacent to residences.")Pg. 1999) Dr. Cohen's opposing view #46 - "Treating fuels may not reduce suppression expenditures. It is a natural mistake to assume that a successful fuel treatment program will result in reduced suppression expenditures. Suppression expenditures rarely depend directly on fuel conditions, but rather on fire location and on what resources are allocated to suppression. The only certain way to reduce suppression expenditures is to make a decision to spend less money suppressing fires." (Pg. 2000) Dr. Cohen's opposing view #47 - "Thinning to reduce crown fire potential requires careful evaluation of the tradeoffs in treatment effects on potential surface fire behavior and crown fire behavior (Scott and Reinhardt, 2001). Thinning will often result in increased potential surface fire behavior, for several reasons. First, thinning reduces the moderating effects of the canopy on windspeed, so surface windspeed will increase (Graham et al., 2004). It also results in increased solar radiation on the forest floor, causing drier surface fuels. It may also cause an increase in flammable grassy and shrub fuels over time, due to the reduced tree competition." (Pg.2000) Dr. Cohen's opposing view #48 - "Some viable fuel treatments may actually result in an increased rate of spread under many conditions (Lertzman et al., 1998; Agee et al., 2000). For example, thinning to reduce crown fire potential can result in surface litter becoming drier and more exposed to wind. It can also result in increased growth of grasses and understory shrubs which can foster a rapidly moving surface fire." (Pg.2000) Dr. Cohen's opposing view #49 - "Treating fuels may not improve ecosystem health. Ecosystem restoration treatment and fuel treatment are not synonymous. Some ecosystem restoration treatments reduce fuel hazard, but not all fuel treatments restore ecosystems. Ecosystem restoration treatments are often designed to recreate presettlement fire regimes, stand structures and species compositions while fuel treatment objectives are primarily to reduce fuels to lessen fire behavior or severity-this is known as ''hazard Reduction.'' Achieving fuel hazard reduction goals in the absence of ecosystem restoration is insufficient (Dombeck et al., 2004; Kauffman, 2004)." (Pg.2000) Dr. Cohen's opposing view #50 - "Conversely, some fuel treatments can reduce fuels but create stands that are quite dissimilar from their historical analogs. Examples include mastication treatments that break, chip, or grind canopy and surface woody material into a compressed fuelbed and thinning treatments that remove the fire adapted species and leave shade-tolerant, late successional species." (Pg.2000) Source: Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States Published in Forest Ecology and Management 256, 2008 http://www.firewise.org/Information/Research-and-Guidance/WUI-Home-Ignition-Research/~/media/Firewise/Files/Pdfs/Research/CohenFuelTreatment.pdf ---------- Concluding Comments Nearly all Forest Service projects that claim to lessen the risks to homeowners living in the WUI propose to reduce hazardous fuels. The NEPA documents that analyze these fuels reduction treatments conveniently do not mention Dr. Cohen's methods because the Purpose & Need is to reduce fuels … not (emphasis added) to protect homeowners as it should be. Reducing hazardous fuels is an alternative way to lessen the risks to homeowners living in the WUI. It is definitely not a goal or objective unto itself and should never appear in the Purpose & Need. However there is a reason most USFS line-officers deal with WUI risks this way. They know hazardous fuels reduction treatments include the logging of merchantable trees which produces volume and helps them meet the Line-Officers who propose hazardous fuels reduction projects are clearly more interested in accumulating volume than they are protecting the public in the WUI. There are laws that prohibit such actions by a public servant whose salary is partially paid by the families living in the WUI.	
Artley, Dick	"Chronic Effects of Glyphosate versus Formulations: Throughout this study glyphosate itself showed no chronic effects on developing tadpoles. The tadpoles reared in the formulations Roundup Original® and Transorb® did show significant physical abnormalities.	The effects of herbicide use were analyzed and disclosed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005). The 4FRI project tiers to this separate NEPA analysis. The Noxious or Invasive Weed EIS evaluated the impacts of

	Abnormalities were also found upon exposure to the surfactant POEA. For all endpoints POEA showed practically identical results to the Roundup Original® formulation whereas the same cannot be said for the Transorb® formulation. The surfactant used in the Transorb formulation is not known (being protected as "Trade Secret"), but has been described as a "surfactant blend". This "surfactant blend" may be responsible for inhibition of metamorphosis, as well as the skewed sex ratio towards female seen in the present study. Developmental abnormalities induced by Roundup are likely a result of endocrine disruption. The thyroid axis can be greatly affected by corticoids and sex steroids which influence hypothalamic and pituitary control (See Dodd and Dodd, 1976, and Hayes, 1997 for review). Corticoids, sex steroids and prolactin have caused delayed metamorphosis and decreased size by both antagonizing and inhibiting thyroid action (Hayes, 1997). Sex steroid can induced sex reversal and intersex in amphibians and mammals, while low thyroid levels interfere with vitellogenesis. A concentration at which the animals were not effected (NOEC) by The Roundup formulations was not determined by this study. "After spraying, glyphosate herbicides can remain in soils for long periods. The herbicide can drift onto neighbouring fields, streams or hedges. Roundup kills beneficial insects. It wipes out habitat for birds and animals. Glyphosate causes genetic damage to fish. It is "extremely lethal to amphibians", according to assistant professor of biology Rick Relyea at the University of Pittsburgh. It is hazardous to earthworms. Glyphosate reduces nitrogen fixation. Roundup reduces the growth of mycorrhizal fungi. Roundup can increase the spread and severity of plant diseases (see WRM Bulletin no. 18)." "Glyphosate herbicides can have a range of impacts on human health, including genetic damage, skin tumours, thyroid damage, anaemia, headaches, nose bleeds, dizziness, tiredness, nausea, eye and skin irritation, asthma and breathing difficulties. Several studies have indicated a link between glyphosate herbicides and non-Hodgkin's lymphoma, a type of cancer." Lang, Chris "Glyphosate	glyphosate based herbicides and proposed restrictions on the use of these chemicals within limited spray zones (buffers around human habitation and recreation sites), near water and other critical wildlife habitat areas. These restrictions and extra protective measures are outlined in the Appendix B - Design Features, Best Management Practices, Required Protection Measures, and Mitigation Measures of the weed EIS. BMP B15 (page 570 of 4FRI DEIS) incorporates the weeds mitigation measures (appendix B of the weed EIS) in their entirety.
Artley, Dick	herbicide, the poison from the skies"	Please see the response to #220-1.
Artley, Dick	"In California, where there is a mandatory system of reporting pesticide poisoning, Glyphosate is the third most common cause of	(220-3) Please see the response to #220-1.

Artley, Dick	pesticide illness in farm workers. It is the most common form of reported pesticide poisoning in landscape gardeners." "Two separate studies in Sweden have linked exposure to Glyphosate to Hairy Cell Leukemia and Non Hodgkins Lymphoma. These types of cancers were extremely rare, however non-Hodgkins lymphoma is the most rapidly increasing cancer in the Western world. It has risen by 73% in the USA since 1973. Another study has found a higher incidence of Parkinson disease amongst farmers who used herbicides, including glyphosate." "Other studies show that Glyphosate and commercial herbicides containing Glyphosate cause a range of cell mutations and damage to cell DNA. These types of changes are usually regarded as precursors to cancer and birth defects." "Studies show that exposure to Glyphosate is associated with a range of reproductive effects in humans and other species. Research from Ontario, Canada found that a father's exposure to Glyphosate was linked to an increase in miscarriages and premature births in farm families." "Glyphosate caused a decrease in the sperm count of rats and an increase in abnormal and dead sperms in rabbits. Pregnant rabbits exposed to Glyphosate had a decrease in the weight of their babies." "Symptoms of exposure to glyphosate include eye irritation, blurred vision, skin rashes, burning or itchy skin, nausea, sore throat and difficulty breathing, headache, lethargy, nose bleeds and dizziness. In lab tests, glyphosate and herbicides containing glyphosate caused genetic damage to human and animal cells. Studies of farmers and other people exposed to glyphosate herbicides link this exposure to increased risks of cancer, miscarriages and attention deficit disorder. Additional laboratory tests have confirmed the results of these studies. Laboratory evidence indicates that glyphosate herbicides can reduce production of sex hormones. Studies of glyphosate contamination of water are limited, but new results indicate that it can easily contaminate streams in both agricultural and urban areas. Glyphosate herbicides cause more off-target damage incidents than all but one other herbicide - 2, 4-D. Glyphosate herbicides cause genetic damage and harm to the immune system in fish. In frogs, glyphosate herbicides cause genetic damage and abnormal development."	Please see the response to #220-1.

Artley, Dick	"Very low doses of some types of the herbicide Roundup can endocrine disruptor the formulations' toxicity may be tied to their "inactive" ingredients rather than the active weed-killing ingredient glyphosate. French scientists report that a number of Roundup formulations tested at very dilute concentrations can alter hormone actions and cause human liver cells to die within 24 hours of treatment. The toxicity of some of the formulations was independent of how much glyphosate - the active herbicide in Roundup - they contained, suggesting it is other "inert" ingredients that may alone - or in combination with each other and/or the weed killer - assault the cells. This study's results are similar to prior studies - as reported in a recent Environmental Health News article - that find human embryo cells are affected more by the Roundup formulations and an inert ingredient than by the active ingredient. The levels of Roundup used in this study are similar to what is typically found in food crops or animal feed treated with Roundup. Because of this, it is possible that people, livestock and wildlife may be exposed to levels of the herbicide mix that can damage cells."	Please see the response to #220-1.
Artley, Dick	"A recent study by eminent oncologists Dr. Lennart Hardell and Dr. Mikael Eriksson of Sweden [1], has revealed clear links between one of the world's biggest selling herbicide, glyphosate, to non-Hodgkin's lymphoma, a form of cancer [2]. In the study published in the 15 March 1999 Journal of American Cancer Society, the researchers also maintain that exposure to glyphosate 'yielded increased risks for NHL.' They stress that with the rapidly increasing use of glyphosate since the time the study was carried out, 'glyphosate deserves further epidemiologic studies.' "	Please see the response to #220-1.
Artley, Dick	"Safe, effective management and control of established exotic-weeds requires input from and the joint effort of scien¬tists from several distinct disciplines, including biological control specialists, chemical control specialists, wildlife ecologists, animal science specialists, economists, and the public. The basic premise of IPM centers on employing first biological and other non-chemical pest controls, with the use of chemical pesticides only as a last resort. Since pesticide effects on public health and the environment cost the United States a conservatively estimated $9 billion per year, this should be a much welcome change."	The 4FRI DEIS project tiers to the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005). The FEIS for this project notes an integrated methodology for treating noxious weeds that relies on mechanical (pulling by hand), biological, as well as the use of herbicides. The 4FRI DEIS notes that there is also a role of prevention so that noxious weeds do not become established (DEIS BMP B16 p568, BMP SW4 pp. 581-82). The strategies for eradicating or controlling noxious weeds are outlined in the Appendix B - Design Features, Best Management Practices, Required Protection Measures, and Mitigation Measures of the weed EIS. BMP B15 (page 570 of 4FRI

		DEIS), incorporates the weeds mitigation measures (appendix B of the weed EIS) in their entirety.
Artley, Dick	"Glyphosate was ranked third worst among all pesticides causing severe health problems among those working in agriculture in the State of California." "The application of glyphosate causes the production of phyto-oestrogens in legumes. These phyto-oestrogens mimic the role of hormones in the bodies of mammals who ingest them. Hence, they may cause severe reproductive system disruptions. The data on estrogen-content of the plants submitted by Monsanto does not reflect the real scope of this problem, because the tested plants were grown in a glyphosate-free environment."	Please see the response to #220-1.
Artley, Dick	"Glyphosate (N-(phosphonomethyl) glycine, C3H8NO5P), a herbicide, used to control unwanted annual and perennial plants all over the world. Nevertheless, occupational and environmental exposure to pesticides can pose a threat to nontarget species including human beings. Therefore, in the present study, genotoxic effects of the herbicide glyphosate were analyzed by measuring chromosomal aberrations (CAs) and micronuclei (MN) in bone marrow cells of Swiss albino mice. A single dose of glyphosate was given intraperitoneally (i.p) to the animals at a concentration of 25 and 50?mg/kg?b.wt. Animals of positive control group were injected i.p. benzo(a)pyrene (100?mg/kg?b.wt., once only), whereas, animals of control (vehicle) group were injected i.p. dimethyl sulfoxide (0.2 mL). Animals from all the groups were sacrificed at sampling times of 24, 48, and 72 hours and their bone marrow was analyzed for cytogenetic and chromosomal damage. Glyphosate treatment significantly increases CAs and MN induction at both treatments and time compared with the vehicle control (P<.05). The cytotoxic effects of glyphosate were also evident, as observed by significant decrease in mitotic index (MI). The present results indicate that glyphosate is clastogenic and cytotoxic to mouse bone marrow."	Please see the response to #220-1.
Artley, Dick	"PITTSBURGH--The herbicide Roundup® is widely used to eradicate weeds. But a study published today by a University of Pittsburgh researcher finds that the chemical may be eradicating much more than that. Pitt assistant professor of biology Rick Relyea found that Roundup®, the second most commonly applied herbicide in the United States, is "extremely lethal" to amphibians. This field	Please see the response to #220-1.

	experiment is one of the most extensive studies on the effects of pesticides on nontarget organisms in a natural setting, and the results may provide a key link to global amphibian declines. In a paper titled "The Impact of Insecticides and Herbicides on the Biodiversity and Productivity of Aquatic Communities," published in the journal Ecological Applications, Relyea examined how a pond's entire community--25 species, including crustaceans, insects, snails, and tadpoles--responded to the addition of the manufacturers' recommended doses of two insecticides--Sevin® (carbaryl) and malathion--and two herbicides--Roundup® (glyphosate) and 2,4-D. Relyea found that Roundup® caused a 70 percent decline in amphibian biodiversity and an 86 percent decline in the total mass of tadpoles. Leopard frog tadpoles and gray tree frog tadpoles were completely eliminated and wood frog tadpoles and toad tadpoles were nearly eliminated. One species of frog, spring peepers, was unaffected."	
Artley, Dick	"For all nine species of larval anurans, the Kruskal-Wallis analyses detected significant effects of pesticide concentration on mortality (p # 0.002; Fig. 1). The subsequent mean comparisons, using Dunnett's tests, indicated the lowest concentrations that caused significantly greater mortality than the control (p , 0.05). For two species (bullfrogs and spring peepers), 1 mg a.e./L of glyphosate caused significantly greater mortality than the control. For the remaining seven species (green frogs, leopard frogs, wood frogs, Cascades frogs, American toads, western toads, and gray tree frogs), 2 mg a.e./L of glyphosate was the lowest concentration to cause significantly greater mortality than the control. Based on the probit analyses, the estimated LC5096-h values for the nine species of larval anurans ranged from 0.8 to 2.0 mg a.e./L (Table 2)."	Please see the response to #220-1.
Artley, Dick	"A recent study of Roundup presents new evidence that the glyphosate-based herbicide is far more toxic than the active ingredient alone. The study, published in the June 2005 issue of Environmental Health Perspectives, reports glyphosate toxicity to human placental cells within hours of exposure, at levels ten times lower than those found in agricultural use. The researchers also tested glyphosate and Roundup at lower concentrations for effects on sexual hormones, reporting effects at very low levels. This	Please see the response to #220-1.

	suggests that dilution with other ingredients in Roundup may, in fact, facilitate glyphosate's hormonal impacts." "The evidence presented in the recent study is supported by earlier laboratory studies connecting glyphosate with reproductive harm, including damaged DNA in mice and abnormal chromosomes in human blood. Evidence from epidemiological studies has also linked exposure to the herbicide with increased risk of non-Hodgkin's lymphoma, and laboratory studies have now begun to hone in on the mechanism by which the chemical acts on cell division to cause cancer. A Canadian study has linked glyphosate exposure in the three months before conception with increased risk for miscarriage and a 2002 study in Minnesota connected glyphosate exposure in farm families with increased incidence of attention deficit disorder."	
Artley, Dick	"Our studies show that glyphosate acts as a disruptor of mammalian cytochrome P450 aromatase activity from concentrations 100 times lower than the recommended use in agriculture, and this is noticeable on human placental cells after only 18 hr, and it can also affect aromatase gene expression. It also partially disrupts the ubiquitous reductase activity but at higher concentrations. Its effects are allowed and amplified by at least 0.02% of the adjuvants present in Roundup, known to facilitate cell penetration, and this should be carefully taken into account in pesticide evaluation. The dilution of glyphosate in Roundup formulation may multiply its endocrine effect. Roundup may be thus considered as a potential endocrine disruptor. Moreover, at higher doses still below the classical agricultural dilutions, its toxicity on placental cells could favor some reproduction problems."	Please see the response to #220-1.
Artley, Dick	"There are serious health implications from the use of this pesticide. There is a long list of reported toxic effects from glyphosate exposure and this Swedish study provides compelling evidence of the links between glyphosate and cancer."	Please see the response to #220-1.
Artley, Dick	"This review suggests that the silvicultural use of glyphosate needs to be re-evaluated with respect to non-target impacts on amphibians in B.C. In addition, knowledge gaps hinder effective and realistic assessment of these impacts. Glyphosate impacts can be species-specific in amphibians, but acute toxicity values are known for only two native B.C. amphibians (the Wood Frog, Rana sylvatica, and the	Please see the response to #220-1.

	Leopard Frog, R. pipiens). The impact of glyphosate herbicides on salamander species and on terrestrial stages of amphibians is not well understood. There is insufficient information on the levels of glyphosate contamination in small ephemeral wetlands, which are favoured habitats of amphibians, and which may be exposed to direct overspraying with herbicide under current use guidelines. Although the surfactant in glyphosate herbicides, POEA, has been identified as potentially the primary ingredient causing toxicity to amphibians, the option of using surfactants of lower toxicity has not been assessed. These knowledge gaps need to be addressed so that best management practices can be developed to minimize non-target impacts on amphibians from the use of glyphosate herbicides in forestry." (Pg. iii)	
Artley, Dick	"E. Wider ecological concerns of the genetically engineered soya beans 1. Glyphosate is a broad-spectrum herbicide which will have major impacts on biodiversity (see Greenpeace Report, 1998, and references therein). It kills all plants indiscriminately. This will destroy wild plants as well as insects, birds, mammals and other animals that depend on the plants for food and shelter. In addition, Roundup (Monsanto's formulation of glyphosate) can be highly toxic to fish. Glyphosate also harms earthworms and many beneficial mycorrhizal fungi and other microorganisms that are involved in nutrient recycling in the soil. It is so generally toxic that researchers are even investigating its potential as an antimicrobial (Roberts et al, 1998)."	Please see the response to #220-1.
Artley, Dick	"Glyphosate was formerly considered relatively non-toxic however there is now a considerable body of evidence for deleterious effects of Roundup, glyphosate and its adjuvants on a wide range of non-target species, including humans. In 2003 the Danish Government announced unprecedented restrictions on glyphosate following analyses which demonstrated that it had been percolating through the soil and polluting the ground water at a rate 5-times that allowable for drinking water. Subsequently, another study confirmed that both glyphosate and its degradation product amino-methylphosphonic acid (AMPA) can leach through structured soils thereby posing a potential risk to the aquatic environment (5). More recently, an analytical method for glyphosate and AMPA based on liquid chromatography coupled to electrospray tandem mass	Please see the response to #220-1.

	spectrometry has been applied to water samples previously found to contain glyphosate (6). The glyphosate concentrations in the re-anaylzed samples were found to be 2 - 14 -fold higher than previously (6) suggesting that contamination of groundwater and other aquatic systems by glyphosate may be even greater than previously thought."	
Artley, Dick	"1. Glyphosate was ranked third worst among all pesticides causing severe health problems among those working in agriculture in the State of California. 2. The application of glyphosate causes the production of phyto-oestrogens in legumes. These phyto-oestrogens mimic the role of hormones in the bodies of mammals who ingest them. Hence, they may cause severe reproductive system disruptions. The data on estrogen-content of the plants submitted by Monsanto does not reflect the real scope of this problem, because the tested plants were grown in a glyphosate-free environment (see above)."	Please see the response to #220-1.
Artley, Dick	"A recently published study by Italian researchers [3] examined the toxicity of four popular glyphosate based herbicide formulations on human placental cells, kidney cells, embryonic cells and neonate umbilical cord cells and surprisingly found total cell death of each of these cells within 24 hours. The researchers reported several mechanisms by which the herbicides caused the cells to die including: cell membrane rupture and damage, mitochondrial damage and cell asphyxia. Following these findings, the researchers tested G, AMPA and POEA by themselves and concluded that, 'It is very clear that if G, POEA, or AMPA has a small toxic effect on embryonic cells alone at low levels, the combination of two of them at the same final concentration is significantly 'deleterious'. Although previous researchers have proposed that the supposed 'inert ingredients' alter the role of cell membrane disruptors in fish, amphibians, microorganisms [4] and plants [5], independent of G, this study is the first of its kind to report similar findings in human cells. The researchers concluded that, "the proprietary mixtures available on the market could cause cell damage and even death around residual levels to be expected, especially in food and feed derived from R [Roundup] formulation-treated crops" which are pervasive in GM-soya."	Please see the response to #220-1.

Artley, Dick	"A study released by an Argentine scientist earlier this year reports that glyphosate, patented by Monsanto under the name "Round Up," causes birth defects when applied in doses much lower than what is commonly used in soy fields. The study was directed by a leading embryologist, Dr. Andres Carrasco, a professor and researcher at the University of Buenos Aires. In his office in the nation's top medical school, Dr. Carrasco shows me the results of the study, pulling out photos of birth defects in the embryos of frog amphibians exposed to glyphosate. The frog embryos grown in petri dishes in the photos looked like something from a futuristic horror film, creatures with visible defects-one eye the size of the head, spinal cord deformations, and kidneys that are not fully developed."	Please see the response to #220-1.
Artley, Dick	"Controversy exists around the use of herbicides more commonly used by home gardeners, such as, 2, 4-D and Roundup. A manufacturer supported review of studies found Roundup safe for use around humans while anti-herbicide groups cite studies that find it affecting human embryonic, placental, and umbilical cells in vitro as well as testosterone development in mice."	Please see the response to #220-1.
Artley, Dick	"According to Mr. Carrasco's research, even tiny quantities of glyphosate could cause embryonic malformations in frogs and thus, by extrapolation, may have implications for humans. "I suspect the toxicity classification of glyphosate is too low ... in some cases this can be a powerful poison," Mr Carrasco told the Financial Times in an interview. He says residents near soya-producing areas began reporting problems from 2002, a couple of years after the first big harvests using genetically modified seeds, which were approved for use in Argentina in 1996. Research by other Argentine scientists and evidence from local campaigners has indicated a high incidence of birth defects and cancers in people living near crop-spraying areas. One study conducted by a doctor, Rodolfo Páramo, in the northern farming province of Santa Fé reported 12 malformations per 250 births, well above the normal rate."	Please see the response to #220-1.
Artley, Dick	"Fish and aquatic invertebrates are more sensitive to Roundup than terrestrial organisms.[24] Glyphosate is generally less persistent in water than in soil, with 12 to 60 day persistence observed in Canadian pond water, yet persistence of over a year have been observed in the sediments of ponds in Michigan and Oregon."[9]	Please see the response to #220-1.

"The EU classifies Roundup as R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment."[25] "Although Roundup is not registered for aquatic uses[26] and studies of its effects on amphibians indicate it is toxic to them,[27] scientists have found that it may wind up in small wetlands where tadpoles live, due to inadvertent spraying during its application. A recent study found that even at concentrations one-third of the maximum concentrations expected in nature, Roundup still killed up to 71 percent of tadpoles raised in outdoor tanks."[28] "In 1996, Monsanto was accused of false and misleading advertising of glyphosate products, prompting a law suit by the New York State attorney general.[42] Monsanto had made claims that its spray-on glyphosate based herbicides, including Roundup, were safer than table salt and "practically non-toxic" to mammals, birds, and fish."[43] "Environmental and consumer rights campaigners brought a case in France in 2001 for presenting Roundup as biodegradable and claiming that it left the soil clean after use; glyphosate, Roundup's main ingredient, is classed by the European Union as "dangerous for the environment" and "toxic for aquatic organisms". In January 2007, Monsanto was convicted of false advertising.[44] The result was confirmed in 2009."[45] "On two occasions, the United States Environmental Protection Agency has caught scientists deliberately falsifying test results at research laboratories hired by Monsanto to study glyphosate.[46][47][48] In the first incident involving Industrial Biotest Laboratories, an EPA reviewer stated after finding "routine falsification of data" that it was "hard to believe the scientific integrity of the studies when they said they took specimens of the uterus from male rabbits".[49][50][51] In the second incident of falsifying test results in 1991, the owner of the lab (Craven Labs), and three employees were indicted on 20 felony counts, the owner was sentenced to 5 years in prison and fined 50,000 dollars, the lab was fined 15.5 million dollars and ordered to pay 3.7 million dollars in restitution.[32][52][53] Craven laboratories performed studies for 262 pesticide companies including Monsanto." "Monsanto has stated that the studies have been repeated, and that Roundup's EPA certification does not now use any studies from Craven Labs or IBT. Monsanto also said that the Craven Labs investigation was started by

	the EPA after a pesticide industry task force discovered irregularities."[54]	
Artley, Dick	"In the study published in the 15 March 1999 Journal of American Cancer Society, the researchers also maintain that exposure to glyphosate 'yielded increased risks for NHL.' They stress that with the rapidly increasing use of glyphosate since the time the study was carried out, 'glyphosate deserves further epidemiologic studies.' "	Please see the response to #220-1.
Artley, Dick	"These latest studies confirm a wealth of evidence on the toxicities of glyphosate and Roundup formulations [2] (Glyphosate Toxic & Roundup Worse , SiS 26), and pinpoint the different sites of action, all of which result in cell death. Epidemiological studies have previously linked glyphosate to spontaneous abortions, non-Hodgkin lymphoma, and multiple myeloma. Laboratory studies showed that glyphosate inhibits transcription in sea urchin eggs and delays development. Brief exposures to glyphosate in rats caused liver damage, and adding the surfactant in Roundup had a synergistic effect, causing greater liver damage. Roundup was also found to be much more lethal to frogs than to weeds, and could have contributed to the global demise of amphibians within the past decades," [3]	Please see the response to #220-1.
Artley, Dick	"Terrestrial toxicity: A number of species of birds, mammals and beneficial insects suffer population loses through habitat and/or food supply destruction resulting from the use of glyphosate. There are also direct lethal and sublethal effects. - Birds LD50 (mg/kg body weight) >3851 - Beneficial Insects oral LD50 >100ug/bee. (Cox 1995b; IPCS 1994) Exposure to freshly applied Roundup killed more than half of three species - a parasitoid wasp, a lacewing, and a ladybug - and more than 80 percent of a predatory beetle. Carabid beetle populations have shown significant decline and slow recovery after glyphosate application (Asterarki et al., 1992; Brust, 1990; Hassan 1988) Glyphosate adversely affects a number of soil and plant fauna, such as the beneficial predatory mites. However, it prolonged larval survival of the foliar-feeding nematode Nothanguinea by 50% thus increasing the damage done by this pest. (Carlisle & Trevore, 1987; Eijsackers 1985) Glyphosate may inhibit a number of fungi that decompose dead plant material. Roundup applied to the soil in repeated doses had a substantial adverse effect on the growth rate	Please see the response to #220-1.

	of earthworms. The reproductive capacity and the total population in the soil could be expected to fall following repeated low doses of biocides. IPCS, however, classifies glyphosate as having low toxicity to earthworms with a No Observed Effects Concentration of 158mg/kg. (Grossbard 1985; IPCS, 1994; Springett and Gray, 1992) Laboratory studies show significant effects on nitrogen fixation, denitrification and nitrification. (IPCS 1994)	
Artley, Dick	Regarding your article, Mystery of Disappearing Honeybees (SiS 34), I am a Dutch beekeeper in the east of the Netherlands near Germany, and we see the same problem with bees, as in Belgium, Germany, France and the whole of Europe. In the Netherlands the government is set to give permission for growing GMOs, even in such a very small country. It will cause a lot of damage: bad for biodiversity, the earth, water, air, drinking water and food. I just lost 68 percent of my bees, and I blame the city workers who sprayed glyphosate twice at the end of October last year. My beehives were 4 metres from the spray, whereas the legal distance is 200 metres. By the beginning of January 2008, the bees started to die. The municipal authorities in villages and small cities spray glyphosate on weeds in public places, gardens and footpaths. In big cities, they would use steam instead of weed killers. I did a 'test' in September 2007 with a bit of glyphosate, and within three or five minutes, the bees were dead. It is very important for the city workers to give people warning when they spray, but they never do. We must study the toxic effects of GMOs and glyphosate, for the sake of the next generation, our children, as well as the sick and old people.	Please see the response to #220-1.
Artley, Dick	"Glyphosate herbicides can have a range of impacts on human health, including genetic damage, skin tumours, thyroid damage, anaemia, headaches, nose bleeds, dizziness, tiredness, nausea, eye and skin irritation, asthma and breathing difficulties. Several studies have indicated a link between glyphosate herbicides and non-Hodgkin's lymphoma, a type of cancer. Not surprisingly, considering the amount of money that Monsanto makes from sales of glyphosate products, the company plays down the health risks of glyphosate. Monsanto claims that glyphosate herbicides pose only a "low risk to human health" as long as glyphosate is used "according to label directions". "	Please see the response to #220-1.

Artley, Dick	"A 1999 study, A Case-Control Study of Non-Hodgkin Lymphoma and Exposure to Pesticides, (American Cancer Society, 1999), found that people exposed to glyphosate are 2.7 times more likely to contract non-Hodgkin Lymphoma. A Finnish study shows that glyphostate decreases the defenses of enzymes of the liver and intestines.18 RoundUp, as a mixture of all its ingredients, has been shown to shut down a powerful antioxidant in the liver that detoxifies harmful compounds so they can be excreted through bile. A paper published in August 2000 shows that RoundUp alters gene expression and inhibits necessary steroid production by disrupting a particular protein expression. In 2002, a paper shows that RoundUp can also affect early cell division processes in embryos.19"	Please see the response to #220-1.
Artley, Dick	"The USDA first deregulated Roundup Ready alfalfa in 2005. Internal emails recently obtained by Truthout show that Monsanto worked closely with regulators to edit its original petition to deregulate the alfalfa. One regulator accepted Monsanto's help in conducting the USDA's original environmental assessment of the alfalfa. Farmers and biotech opponents soon filed a lawsuit against the USDA to challenge the initial deregulation. In 2007, a federal court ruled that the USDA did not consider the full environmental impacts of Roundup Ready alfalfa and vacated the agency's decision to deregulate the alfalfa. Monsanto and its allies appealed the decision, and last year, the Supreme Court reversed the lower court's ruling, but ordered the USDA to produce an Environmental Impact Statement (EIS) on the alfalfa before allowing it back into America's fields. The USDA released a final EIS on Roundup Ready alfalfa in late 2010, and the GE alfalfa was fully deregulated on January 27. The USDA went on to approve two more GE seeds within weeks of the alfalfa decision. Roundup Ready alfalfa was deregulated just weeks after USDA Secretary Tom Vilsack was pressed by Republican Congressmen, some of whom recently received campaign contributions from Monsanto and the biotech industry, to dump a proposal to geographically isolate Roundup Ready alfalfa from organic and conventional alfalfa and, instead, legalize the GE seed without any government oversight. The latest lawsuit filed by CFS and its allies argues that the final EIS ignores or downplays the threats Roundup Ready alfalfa poses to conventional alfalfa farms	Please see the response to #220-1.

	and the environment."	
Artley, Dick	"JH: You said you had found that very low doses of glyphosate had caused these effects on aromatase. Are they the kind of doses that would be used in practical agriculture in the European Union?" "GE-S: They are about ten to 100 times less than the doses used by agricultural workers. One has to be cautious because these are in vitro results but we do not want to wait for death when the precautionary principle suggests a need for measures to avoid any harmful effects on foetuses and children."	Please see the response to #220-1.
Artley, Dick	"The December/January 2010 issue of The Organic & Non-GMO Report featured an interview with Robert Kremer, an adjunct professor in the Division of Plant Sciences at the University of Missouri, whose research showed negative environmental impacts caused by glyphosate, the main ingredient in Monsanto's Roundup herbicide, which is used extensively with Roundup Ready genetically modified crops." "The widespread use of glyphosate is causing negative impacts on soil and plants as well as possibly animal and human health. These are key findings of Don Huber, emeritus professor of plant pathology, Purdue University."	Please see the response to #220-1.
Artley, Dick	"There is, indeed, direct evidence that glyphosate inhibits RNA transcription in animals at a concentration well below the level that is recommended for commercial spray application. Transcription was inhibited and embryonic development delayed in sea urchins following exposure to low levels of the herbicide and/or the surfactant polyoxyethyleneamine. The pesticide should be considered a health concern by inhalation during spraying [4]." "New research shows that a brief exposure to commercial glyphosate caused liver damage in rats, as indicated by the leakage of intracellular liver enzymes. In this study, glyphosate and its surfactant in Roundup were also found to act in synergy to increase damage to the liver [5]."	Please see the response to #220-1.
Artley, Dick	"In contrast to malathion, Roundup had strong direct effects on the tadpoles. Roundup caused a 40% reduction in total tadpole survival and biomass. The impact of Roundup (with POEA [polyethoxylated tallow-amine] surfactant) is consistent with previous laboratory studies in a variety of species. Mann and Bidwell (1999) estimated LC5048h at 3.9 to 15.5 mg active ingredient (AI)/L in four species of	Please see the response to #220-1.

Artley, Dick	Australian tadpoles while Perkins et al. (2000) estimated LC5096h values of 12.4 mg AI/L in the African clawed frog (Xenopus laevis). In both studies, it was clear that the high toxicity of Roundup was caused by the POEA surfactant and not from the active ingredient (glyphosate). Lajmanovich et al. (2003) examined the impact of Kleeraway (another formulation of glyphosate that contains the POEA surfactant) on a South American tadpole (Scinax nasicus) and found an LC5048h of 1.74 mg AI/L. In North American tadpoles (Bufo americanus, Rana pipiens, and R. clamitans), Edginton et al. (2004) found LC5096h of 1.5-4.7 mg AI/l using Vision (a formulation that also includes the POEA surfactant). For the three species used in our mesocosm experiment, Relyea (2005b) found LC5016d values of 1.4 mg AI/L for gray tree frogs, 2.5 mg AI/L for American toads, and 2.5 mg AI/L for leopard frogs. All of this suggests that Roundup with the POEA surfactant can cause substantial mortality in larval amphibians." "The decline in amphibians across the globe has sparked a search for the causes, and recent evidence suggests a connection with pesticides. However, for most pesticides, tests on amphibians are rare and conducted only for short durations (1 to 4 days) and without natural stressors. Recent studies have discovered that the stress of predator cues in the water can make insecticides much more lethal to larval amphibians, but it is unknown whether this phenomenon can be generalized to other types of pesticides. Using six species of North American amphibian larvae (Rana sylvatica, R. pipiens, R. clamitans, R. catesbeiana, Bufo americanus, and Hyla versicolor), I examined the impact of a globally common herbicide (Roundup) on the survival of tadpoles for 16 days with and without the chemical cues emitted by predatory newts (Notophthalmus viridescens). LC5016-d estimates varied from 0.55 to 2.52 mg of active ingredient (AI)/L, which was considerably lower than the few previous studies using Roundup (1.5 to 15.5 mg AI/L). Moreover, in one of the six species tested (R. sylvatica), the addition of predatory stress made Roundup twice as lethal. This discovery suggests that synergistic interactions between predatory stress and pesticides may indeed be a generalizable phenomenon in amphibians that occurs with a wide variety of pesticides."	Please see the response to #220-1.

Artley, Dick	"Species richness was reduced by 15% with Sevin, 30% with malathion, and 22% with Roundup, whereas 2,4-D had no effect. Both insecticides reduced zooplankton diversity by eliminating cladocerans but not copepods (the latter increased in abundance). The insecticides also reduced the diversity and biomass of predatory insects and had an apparent indirect positive effect on several species of tadpoles, but had no effect on snails. The two herbicides had no effects on zooplankton, insect predators, or snails. Moreover, the herbicide 2,4-D had no effect on tadpoles. However, Roundup completely eliminated two species of tadpoles and nearly exterminated a third species, resulting in a 70% decline in the species richness of tadpoles. This study represents one of the most extensive experimental investigations of pesticide effects on aquatic communities and offers a comprehensive perspective on the impacts of pesticides when nontarget organisms are examined under ecologically relevant conditions."	Please see the response to #220-1.
Artley, Dick	"He is joined in his conclusions by Robert Bellé, from the National Center for Scientific Research (CNRS) biological station in Roscoff (Finistere), whose team has been studying the impact of glyphosate formulations on sea-urchin cells for several years. This recognized model for the study of early stages of cancer genesis earned Tim Hunt the 2001 Nobel Prize in medicine. In 2002, the Finisterian team had shown that Roundup acted on one of the key stages of cellular division. The Breton team has recently demonstrated (Toxicological Science, December 2004) that a "control point" for DNA damage was affected by Roundup, while glyphosate alone had no effect. "We have shown that it's a definite risk factor, but we have not evaluated the number of cancers potentially induced, nor the time frame within which they would declare themselves," the researcher acknowledges. A sprayed droplet could affect thousands of cells. On the other hand, "the concentration in water and fruits is lower, which is rather reassuring."	Please see the response to #220-1.
Artley, Dick	"We have evaluated the toxicity of four glyphosate (G)-based herbicides in Roundup (R) formulations, from 105 times dilutions, on three different human cell types. This dilution level is far below agricultural recommendations and corresponds to low levels of residues in food or feed. The formulations have been compared to G	Please see the response to #220-1.

	alone and with its main metabolite AMPA or with one known adjuvant of R formulations, POEA. HUVEC primary neonate umbilical cord vein cells have been tested with 293 embryonic kidney and JEG3 placental cell lines. All R formulations cause total cell death within 24 h, through an inhibition of the mitochondrial succinate dehydrogenase activity, and necrosis, by release of cytosolic adenylate kinase measuring membrane damage. They also induce apoptosis via activation of enzymatic caspases 3/7 activity. This is confirmed by characteristic DNA fragmentation, nuclear shrinkage (pyknosis), and nuclear fragmentation (karyorrhexis), which is demonstrated by DAPI in apoptotic round cells. G provokes only apoptosis, and HUVEC are 100 times more sensitive overall at this level. The deleterious effects are not proportional to G concentrations but rather depend on the nature of the adjuvants. AMPA and POEA separately and synergistically damage cell membranes like R but at different concentrations. Their mixtures are generally even more harmful with G. In conclusion, the R adjuvants like POEA change human cell permeability and amplify toxicity induced already by G, through apoptosis and necrosis. The real threshold of G toxicity must take into account the presence of adjuvants but also G metabolism and time-amplified effects or bioaccumulation. This should be discussed when analyzing the in vivo toxic actions of R. This work clearly confirms that the adjuvants in Roundup formulations are not inert. Moreover, the proprietary mixtures available on the market could cause cell damage and even death around residual levels to be expected, especially in food and feed derived from R formulation-treated crops." "We exposed human liver HepG2 cells, a well-known model to study xenobiotic toxicity, to four different formulations and to glyphosate, which is usually tested alone in chronic in vivo regulatory studies. We measured cytotoxicity with three assays (Alamar Blue®, MTT, ToxiLight®), plus genotoxicity (comet assay), anti-estrogenic (on ERa, ERß) and anti-androgenic effects (on AR) using gene reporter tests. We also checked androgen to estrogen conversion by aromatase activity and mRNA. All parameters were disrupted at sub-agricultural doses with all formulations within 24 h. These effects were more	
Artley, Dick	dependent on the formulation than on the glyphosate concentration.	Please see the response to #220-1.

	First, we observed a human cell endocrine disruption from 0.5 ppm on the androgen receptor in MDA-MB453-kb2 cells for the most active formulation (R400), then from 2 ppm the transcriptional activities on both estrogen receptors were also inhibited on HepG2. Aromatase transcription and activity were disrupted from 10 ppm. Cytotoxic effects started at 10 ppm with Alamar Blue assay (the most sensitive), and DNA damages at 5 ppm. A real cell impact of glyphosate-based herbicides residues in food, feed or in the environment has thus to be considered, and their classifications as carcinogens/mutagens/reprotoxics is discussed." "There is, indeed, direct evidence that glyphosate inhibits RNA transcription in animals at a concentration well below the level that is recommended for commercial spray application. Transcription was inhibited and embryonic development delayed in sea urchins following exposure to low levels of the herbicide and/or the surfactant polyoxyethyleneamine. The pesticide should be considered a health concern by inhalation during spraying [4]." New research shows that a brief exposure to commercial glyphosate caused liver damage in rats, as indicated by the leakage of intracellular liver enzymes. In this study, glyphosate and its surfactant in Roundup were also found to act in synergy to increase damage to the liver [5]. Three recent case-control studies suggested an association between glyphosate use and the risk of non-Hodgkin lymphoma [6-8]; while a prospective cohort study in Iowa and North Carolina that includes more than 54 315 private and commercial licensed pesticide applicators suggested a link between glyphosate use and multiple myoeloma [9]. Myeloma has been associated with	
Artley, Dick	agents that cause either DNA damage or immune suppression."	This comment is the same as #220-33 but with one added paragraph. Please see the response to #220-1.
Artley, Dick	"New scientific studies link Roundup (glyphosphate), the most widely used herbicide in the world, to a host of health risks, such as cancer, miscarriages and disruption of human sex hormones."	Please see the response to #220-1.
Artley, Dick	"A series of studies has found that farmers develop non-Hodgkin's lymphoma more often than other people do, but until now it has been difficult for scientists to explain why this increase occurs. New research, however, shows that exposure to the herbicide glyphosate, commonly sold as Roundup, is one explanation. The study was published in 2003 by researchers at the National Cancer Institute, the	Please see the response to #220-1.

	University of Nebraska Medical Center, Kansas University Medical Center, and the University of Iowa College of Medicine." "5. SUMMARY OF GLYPHOSATE IMPACTS ON AMPHIBIANS This summary is derived almost entirely from toxicological studies on tadpoles and late-stage anuran embryos. The impact of glyphosate herbicides on other amphibians and other life stages is virtually unknown. * Recent studies have shown that tadpoles are one of the vertebrate groups most sensitive to the toxicity effects of most commercial formulations of glyphosate herbicides, including Vision. * The estimated LC50 values for some species of amphibians are at or below the expected environmental concentration (EEC) of 1.43 mg a.e./L of Vision (Table 1). Most LC50 values are calculated from experimental durations of 24 to 96 hours, but at low concentrations death may not occur until after 96 hours. This suggests that amphibians may be even more sensitive than the published LC50 values suggest. * Although LC50 values have traditionally been used to set hazard quotients, recent risk analysis methodology suggests that LC10 values are better for judging population-level impacts of environmental contaminants (Solomon and Thompson 2003). In at least one published study, all North American amphibian larvae tested to date had LC10 values estimated at or below the EEC for Vision, especially at pH higher than 7.0. * In addition to direct mortality effects, glyphosate herbicides also cause sublethal effects, including reduced growth and development rates, behavioural impairment, and genomic effects. The population-level consequences of these sublethal effects have not been tested under field conditions. For example, reduced growth and development rates, which have been documented under laboratory conditions, could translate into increased mortality if amphibian larvae are unable to metamorphose before the end of the season. Similarly, impaired behavioural response to prodding under laboratory conditions could translate to increased susceptibility to predators under field conditions. * Impacts have been shown to be synergistically enhanced by interaction with some environmental factors. Of particular concern is that the effects of glyphosate herbicide may be greater when pond pH is 7 or higher (Edginton et	
Artley, Dick	al. 2004a). Amphibians in general avoid acidic conditions, preferring	Please see the response to #220-1.

	to breed in ponds with higher pH, which could increase their vulnerability to glyphosate herbicide impacts. * More detailed toxicological studies indicate that the toxicity of glyphosate herbicides arises not from the active ingredient, glyphosate, but from the surfactant, POEA. * POEA is thought to interfere with the synthesis of collagen and to reduce the branchial cartilage in the gills of tadpoles and to cause lysis of gill epithelial cells in fish. This could result in loss of osmotic stability and asphyxiation. The toxic mode of action in terrestrial, postmetamorphic amphibians is not known at formulations without POEA surfactants, such as Rodeo, and formulations with other surfactants, such as Roundup Biactive, have reduced toxicity to amphibians. (pg. 31) "Chronic Effects of Glyphosate versus Formulations: Throughout this study glyphosate itself showed no chronic effects on developing tadpoles. The tadpoles reared in the formulations Roundup Original® and Transorb® did show significant physical abnormalities. Abnormalities were also found upon exposure to the surfactant POEA. For all endpoints POEA showed practically identical results to the Roundup Original® formulation whereas the same cannot be said for the Transorb® formulation. The surfactant used in the Transorb formulation is not known (being protected as "Trade Secret"), but has been described as a "surfactant blend". This "surfactant blend" may be responsible for inhibition of metamorphosis, as well as the skewed sex ratio towards female seen in the present study. Developmental abnormalities induced by Roundup are likely a result of endocrine disruption. The thyroid axis can be greatly affected by corticoids and sex steroids which influence hypothalamic and pituitary control (See Dodd and Dodd, 1976, and Hayes, 1997 for review). Corticoids, sex steroids and prolactin have caused delayed metamorphosis and decreased size by both antagonizing and inhibiting thyroid action (Hayes, 1997). Sex steroid can induced sex reversal and intersex in amphibians and mammals, while low thyroid levels interfere with vitellogenesis. A concentration at which the animals were not effected (NOEC) by The Roundup formulations was	
Artley, Dick	not determined by this study." Concern #1: Roundup is only intended for terrestrial use, not aquatic	Please see the response to #220-1.
Artley, Dick	use While it may be intended for terrestrial use, there is	Please see the response to #220-1.

overwhelming evidence that Roundup gets into aquatic habitats, typically through inadvertent (or unavoidable) aerial overspray (Newton et al. 1984, Goldsborough and Brown 1989, Feng et al. 1990, Thompson et al. 2004). To determine the effect on amphibians, Relyea (2005a) simulated a direct overspray of a small wetland using pond mesocosms (1000-liter tanks). The result was widespread death for many species and the death rate was much higher than expected based on previous studies of Roundup. It is relatively common knowledge that Roundup should not be applied to large ponds and lakes, but it seems to be much less commonly appreciated that many amphibians are not produced in large ponds and lakes due to predation by fish. Instead, small temporary wetlands that may appear to be unimportant and only have 6" of water can, in fact, produce thousands of tadpoles. These small, temporary pools are either not avoided or not avoidable by aerial pesticide applications. Moreover, Roundup is not only lethal to amphibian larvae. New studies have found that Roundup can be highly lethal to terrestrial amphibians as well (Relyea 2005c)." "Concern #2: The application rate of Roundup was 7 times too high The application rate of 6 ounces per 300 square feet came directly from the label of Monsanto's "Roundup Weed and Grass Killer". What Monsanto is claiming is that the application rate for this Roundup is higher than their listed application rate for other forms of Roundup. However, both application rates come from Monsanto. Moreover, it is well accepted by Monsanto and the applicators of Roundup that some types of weeds require up to four times the recommended application rate to be effective." "Concern #4: A past risk assessment has shown that Roundup poses minimal risk to amphibians The risk assessment was conducted by Giesy et al. (2000), in cooperation with Monsanto, and the assessment was based on the available data at that time. For amphibians, data only existed for four species of Australian tadpoles and one species of African frog. From these studies, the LC50 estimates (the amount of pesticide needed to kill 50% of the animals) were 4 to 16 mg a.i./L (Mann and Bidwell 1999, Perkins et al. 2000). More recent LC50 laboratory data for North American amphibians demonstrate that North American amphibians are much more sensitive; LC50 values range from 0.5 to 4.7 mg a.i./L

Artley, Dick	(Edginton et al. 2004, Relyea 2005b). According to U.S. Fish and Wildlife classifications, this means that Roundup can no longer be considered slightly to moderately toxic, but rather moderately to highly toxic to North American amphibians." "Based on the best available information, the Agency makes a Likely to Adversely Affect determination for the CRLF from the use of glyphosate. Additionally, the Agency has determined that there is the potential for modification of CRLF designated critical habitat from the use of the chemical. This assessment indicates that direct effects to the terrestrial-phase CRLF eating broadleaf plants, small insects and small herbivorous mammals on a dietary-basis may be at risk following chronic exposure to glyphosate at application rates of 7.5 lb a.e./A and above (forestry, areas with impervious surfaces and rights of way). In addition, for one particular formulation (Registration No. 524-424), medium and large-sized CRLF's eating small herbivorous mammals on a dose-basis may be at risk following acute exposure at an application rate of 5.5 lb formulation/A (industrial outdoor uses). At the lowest application rate of 1.1 lb formulation/A, there is potential risk to medium-sized CRLF's eating small herbivorous mammals on a dose-basis (ornamental lawns and turf)." (Pg. 173)	Please see the response to #220-1.
Artley, Dick	"Glyphosate is the poster child for the global pesticide controversy due to its place in the ongoing debate over mega-farming and genetically engineered crops. Industry scientists say it's one of the safest herbicides in the world, while independent scientists have discovered potential links among the widespread use of glyphosate-based herbicides and non-Hodgkin's lymphoma, birth defects and even attention deficit disorder. Research also shows that additives like surfactants in glyphosate in herbicides like Roundup are more toxic than glyphosate itself and can increase the toxicity of glyphosate." "The war on invasive species is a war on a fact of life. Humans have caused or exacerbated these species "invasions" by changing habitats and introducing species to new areas, and now we are trying to turn back the clock in an attempt to prevent nature from taking its new course. As long as people attempt to dominate the land, extract its resources and shape it to their liking, there will be money to be made and dramatic consequences for other livings	Please see the response to #220-1.

	things. The search for a balance between supporting our collective desire to prosper and a healthy natural world is sure to spark more heated debates for years to come." "We also observed a gradual loss of the r3 and r5domains in embryos treated with GBH (compare Figure 5E,Fwith D), which resembles the results observed in frog embryosin the krox-20 domains (Figures 1B and 2E). Hybridization withthe c-shh probe showed that, as in Xenopus, the prechordalmesoderm domain is preferentially lost in GBH-treated chickembryos (compare Figure 5G with H,I). As the GBH concentra-tion increases, the expression along the embryonic dorsal midlinealso gradually disappears (Figure 5H,I).Therefore, our experiments with chick embryos further extendconclusions from studies about the teratogenic effects of GBHin amphibians to other vertebrate species.DiscussionThe results presented above argue that both GBH andglyphosate itself interfere with key molecular mechanismsregulating early development in both Xenopus and chickenembryos, leading to congenital malformations. Sublethal dosesof the herbicide (430 µM of glyphosate in 1/5000 dilutions ofGBH) and injections leading to a final concentration of 8 to 12µM of glyphosate in the injected side of the embryo weresufficient to induce serious disturbances in the expression ofslug, otx2, and shh. These molecular phenotypes were correlatedwith a disruption of developmental mechanisms involving theneural crest, embryonic dorsal midline formation, and cephalicpatterning. Because glyphosate penetration through the cellmembrane requires facilitation by adjuvants present in com-mercial formulations (5, 6), we tested the effects of glyphosatealone by directly microinjecting it into Xenopus embryos. Thesimilarity of the phenotypes obtained in both situations suggeststhat they are attributable to the active principle of GBH andnot to the adjuvants.We will discuss our results in the following context: (1) thecorrelation of our phenotypes with those observed in animalmodels with an impairment of RA signaling or deficits in theexpression of critical genes that control embryonic development;(2) the probable mechanisms underlying the phenotypes inducedby GBH and glyphosate; (3) possible correlations with clinicalcases of human offspring exhibiting malformations in	
Artley, Dick	zonesexposed to GBH.Misregulation of RA, shh, and otx2 Are	Please see the response to #220-1.

	Involved inCephalic Malformations and Neural Crest-Derived Phenotypes Reminiscent of the Effects of GBH and Glyphosate.The phenotypes obtained after GBH treatments or injections ofglyphosate alone are strikingly reminiscent of those observedas a consequence of an excess of RA signaling in vertebratesand humans. Acute or chronic increase of RA levels leads toteratogenic effects during human pregnancy and in experimentalFigure 4. Phenotype induced by GBH is mediated by an increase ofRA signaling (A). Analysis of RA activity with the reporter plasmidRAREZ. All embryos were injected with the reporter plasmid RAREZ,except for uninjected controls, and left untreated or were treated asindicated in the figure until stage 14-15, when they were processed.Results are expressed as arbitrary luminiscence units per µg of protein.A two-tailed t test was employed to analyze the significance in thedifference of the means. ** $p < 0.01$; *** $p < 0.0001$. (B-G) WMISHfor shh and otx2 at tailbud stages. (B) Control embryo. Notochord (n);floor plate (fp); brain (space between bars), eye (arrowhead). (C)Embryo treated with 1/5000 GBH manifesting microcephaly (spacebetween bars), reduced eyes (arrowhead), diminished Shh signalingfrom the prechordal mesoderm (arrow), and shortened A-P axis (78%,n)9)." (Pg. 6)	
Artley, Dick	"Although there is only a handful of studies on the safety of GM soybeans, there is considerable evidence that glyphosate-especially in conjunction with the other ingredients in Roundup-wreaks havoc with the endocrine and reproductive systems. 'I think the concentration of glyphosate in the soybeans is the likely cause of the problem,' says Ewen. Glyphosate throws off the delicate hormonal balance that governs the whole reproductive cycle. 'It's an endocrine buster,' says Ewen, 'that interferes with aromatase, which produces estrogen.' Aromatase is required by luteal cells to produce hormones for the normal menstrual cycle, but it's those luteal cells that have shown considerable alterations in the rats fed GM soybeans. Glyphosate is also toxic to the placenta, the organ which connects the mother to the fetus, providing nutrients and oxygen, and emptying waste products. In a 2009 French study at the University of Caen, scientists discovered that glyphosate can kill the cells in the outer layer of the human placenta (the trophoblast membrane), which in turn can kill the placenta. The placenta cells are, in Ewen's words, 'exquisitely sensitive to glyphosate.' Only 1/500th the amount needed to kill weeds was able to kill the cells. The amount is so small, according to the study authors the 'residual levels to be expected, especially in food and feed derived from R[oundup] formulation-treated crops' could be enough to 'cause cell damage and even [cell] death.' Furthermore, the effect of the toxin may bioaccumulate, growing worse with repeated consumption from Roundup laden foods.	
Artley, Dick	"Such reports gained further traction after an Argentine government scientist, Andres Carrasco conducted a study, "Glyphosate-Based Herbicides Produce Teratogenic Effects on Vertebrates by Impairing Retinoic Acid Signaling" in 2009. The study, published in the journal	Please see the response to #220-1.

Artley, Dick	Chemical Research in Toxicology in 2010, found that glyphosate causes malformations in frog and chicken embryos at doses far lower than those used in agricultural spraying. It also found that malformations caused in frog and chicken embryos by Roundup and its active ingredient glyphosate were similar to human birth defects found in genetically modified soy-producing regions. "The findings in the lab are compatible with malformations observed in humans exposed to glyphosate during pregnancy," wrote Carrasco, director of the Laboratory of Molecular Embryology at the University of Buenos Aires. "I suspect the toxicity classification of glyphosate is too low." " "Fagan told HuffPost that among developmental biologists who are not beholden to the chemical industry or the biotechnology industry, there is strong recognition that Carrasco's research is credible." "For me as a scientist, one of the reasons I made the effort to do this research into the literature was to really satisfy the question myself as to where the reality of the situation lies," he added. "Having thoroughly reviewed the literature on this, I feel very comfortable in standing behind the conclusions Professor Carrasco came to and the broader conclusions that we come to in our paper." "We can't figure out how regulators could have come to the conclusions that they did if they were taking a balanced took at the science, even the science that was done by the chemical industry itself." "This study was just routine," said Russian biologist Alexey V. Surov, in what could end up as the understatement of this century. Surov and his colleagues set out to discover if Monsanto's genetically modified (GM) soy, grown on 91% of US soybean fields, leads to problems in growth or reproduction. What he discovered may uproot a multi-billion dollar industry. After feeding hamsters for two years over three generations, those on the GM diet, and especially the group on the maximum GM soy diet, showed devastating results. By the third generation, most GM soy-fed hamsters lost the ability to have babies. They also suffered slower growth, and a high mortality rate among the pups. And if this isn't shocking enough, some in the third generation even had hair growing inside their mouths-a phenomenon rarely seen, but apparently more prevalent among hamsters eating GM soy." "In addition to the GMOs, it could be	This is an article dealing with Genetically-modified organisms (GMOs) and has no bearing on the 4FRI project.

Artley, Dick	contaminants, he said, or higher herbicide residues, such as Roundup. There is in fact much higher levels of Roundup on these beans; they're called "Roundup Ready." Bacterial genes are forced into their DNA so that the plants can tolerate Monsanto's Roundup herbicide. Therefore, GM soy always carries the double threat of higher herbicide content, couple with any side effects of genetic engineering. Without detailed tests, no one can pinpoint exactly what is causing the reproductive travesties in Russian hamsters and rats, Italian and Austrian mice, and livestock in India and America. And we can only speculate about the relationship between the introduction of genetically modified foods in 1996, and the corresponding upsurge in low birth weight babies, infertility, and other problems among the US population. But many scientists, physicians, and concerned citizens don't think that the public should remain the lab animals for the biotech industry's massive uncontrolled experiment. Alexey Surov says, "We have no right to use GMOs until we understand the possible adverse effects, not only to ourselves but to future generations as well. We definitely need fully detailed studies to clarify this. Any type of contamination has to be tested before we consume it, and GMO is just one of them." "A study released by an Argentine scientist earlier this year reports that glyphosate, patented by Monsanto under the name "Round Up," causes birth defects when applied in doses much lower than what is commonly used in soy fields. The study was directed by a leading embryologist, Dr. Andres Carrasco, a professor and researcher at the University of Buenos Aires. In his office in the nation's top medical school, Dr. Carrasco shows me the results of the study, pulling out photos of birth defects in the embryos of frog amphibians exposed to glyphosate. The frog embryos grown in petri dishes in the photos looked like something from a futuristic horror film, creatures with visible defects-one eye the size of the head, spinal cord deformations, and kidneys that are not fully developed. "We injected the amphibian embryo cells with glyphosate diluted to a concentration 1,500 times than what is used commercially and we allowed the amphibians to grow in strictly controlled conditions." Dr. Carrasco reports that the embryos survived from a fertilized egg state until the tadpole stage, but developed obvious defects which	Please see the response to #220-1.

	would compromise their ability to live in their normal habitats.	
Artley, Dick	"Relyea found that Roundup caused a 70 percent decline in amphibian biodiversity and an 86 percent decline in the total mass of tadpoles. Leopard Frog tadpoles and Gray Treefrog tadpoles were completely eliminated and Wood Frog tadpoles and toad (Bufo) tadpoles were nearly eliminated. One species of frog, Spring Peepers, was unaffected. "The most shocking insight coming out of this was that Roundup, something designed to kill plants, was extremely lethal to amphibians," said Relyea, who conducted the research at Pitt's Pymatuning Laboratory of Ecology. "We added Roundup, and the next day we looked in the tanks and there were dead tadpoles all over the bottom." "	Please see the response to #220-1.
Artley, Dick	"False Research The EPA has twice caught scientists deliberately falsifying results at research laboratories hired by Monsanto to study glyphosate. In 1983, the EPA revealed that Industrial Biotest Laboratories (IBL) routinely falsified results of their 1971 research performed on glyphosate. Tests performed at IBL included eleven out of nineteen total chronic toxicology studies on glyphosate; studies instrumental in its retaining registration in 1974. In 1991, the EPA alleged that Craven Laboratories, another lab hired by Monsanto to study the effects of glyphosate, had falsified test results. Several methods were used, including manipulation of equipment and notebook entries." "Alaska has an economic and cultural dependence on the welfare of salmon and other fish species, so it is particularly vital for Alaskans to know that glyphosate, and even more so glyphosate herbicides, are acutely toxic to fish. The toxicity of glyphosate, which is most potently dangerous to younger fish, increases as water temperature rises. Ironically, the use of glyphosate causes water temperatures to increase for several years following treatment, as the herbicide kills shading vegetation. This is significant in more than one way for salmon, as juvenile salmon require cold water to thrive under even normal environmental circumstances. The effects of glyphosate on fish have been documented using rainbow trout, which exhibited erratic swimming and labored breathing, effects which can increase the risk that fish will be eaten, as well as affecting ability to feed, migrate, and reproduce."	Please see the response to #220-1.

Artley, Dick	"Worldwide, amphibian populations are reported to be in a state of decline. Causative factors are incompletely understood. In ecosystems of northeastern North America, multiple stressors of pesticide contamination and acidification may be involved. As an initial component of a multi-tier investigation, the effects of forest-use herbicides Vision® (glyphosate) andRelease® (triclopyr) are being studied using Xenopus laevis, Rana pipiens and Rana clamitans. Two different life stages of amphibians, embryos (blastula stage) and larvae (Gosner stage 25), are being used. Interactive effects of various herbicide concentrations and pH (5.5 and 7.5) are being studied using the organisms exposed in 96hr static renewal tests. The Frog Embryo Teratogenesis Assay - Xenopus (FETAX) protocol is used for the embryo stage for the determination of mortality, malformation and growth data. The larval exposures are being developed and refined to compare sensitivities to the FETAX assay. The larval 96hr static renewal exposure is followed by a 10-day water-only recovery period. Sensitivities are being compared to determine the appropriateness of the exotic amphibian Xenopus laevis for toxicity testing. Results on toxicity to date indicate that Vision® is more toxic to all species at pH 7.5 than at pH 5.5. The reverse has been shown for Release®. In addition, the larval stage has consistently been shown to be more sensitive than the blastula stage. Understanding species sensitivities and herbicide/pH interactions will aid in altering forestry herbicide use patterns to minimize effects on amphibians and other non-target organisms."	Please see the response to #220-1.
Artley, Dick	"We have evaluated the toxicity of four glyphosate (G)-based herbicides in Roundup (R) formulations, from 105 times dilutions, on three different human cell types. This dilution level is far below agricultural recommendations and corresponds to low levels of residues in food or feed. The formulations have been compared to G alone and with its main metabolite AMPA or with one known adjuvant of R formulations, POEA. HUVEC primary neonate umbilical cord vein cells have been tested with 293 embryonic kidney and JEG3 placental cell lines. All R formulations cause total cell death within 24 h, through an inhibition of the mitochondrial succinate dehydrogenase activity, and necrosis, by release of cytosolic adenylate kinase measuring membrane damage. They also induce	Please see the response to #220-1.

	apoptosis via activation of enzymatic caspases 3/7 activity. This is confirmed by characteristic DNA fragmentation, nuclear shrinkage (pyknosis), and nuclear fragmentation (karyorrhexis), which is demonstrated by DAPI in apoptotic round cells. G provokes only apoptosis, and HUVEC are 100 times more sensitive overall at this level. The deleterious effects are not proportional to G concentrations but rather depend on the nature of the adjuvants. AMPA and POEA separately and synergistically damage cell membranes like R but at different concentrations. "Case example: Okanogan NF Integrated Weed Management Environmental Assessment (EA) (1997, 1999) The Okanogan NF Integrated Weed Management EA for 1997 received many comments from the public asking for documentation and analysis of the risks of herbicides to human health and safety, yet all of these concerns for safety were lumped into a single issue on p. 15-16: Noxious weed populations can degrade recreational experiences by decreasing the desirability of campsites, replacing native plant populations in developed and dispersed areas and changing the scenery. Herbicide contact could pose risks to human health through skin exposure, inhalation, or ingestion. Some noxious weeds also pose risks to human health. The marginalization of human health as mere "issues" rather than actual hazards suggests that there was never any intention of questioning the safety or use of herbicides, except in a very limited fashion, and this is borne out in the analysis section. Two years later the Okanogan NF prepared a second EA (1999) and through another public comment process, the issues identified through public comments were exactly the same. Why are the issues of public health ignored? According to the rationalization given in the EA (Okanogan NF, 1997, p. 17), public comments were addressed in a "higher level document". In other words, concerns about human health and safety were not considered in the EA. By its limited scope, the agency effectively avoids having to consider issues that it doesn't want to. The purpose of an EA is to assess a problem, propose and evaluate alternatives and select the most effective remedy, which should be the least harmful to the environment. In this case, the alternative to use herbicides had been selected prior to	
Artley, Dick	doing an analysis. The EA was only used to justify a predetermined	Please see the response to #220-1.

	decision rather than truly explore alternatives."	
Artley, Dick	"In one study, for instance, we exposed neural stage embryos and newly hatched tadpoles of green frogs to low levels of the herbicide glyphosate. Following 96 hours of exposure to the herbicide, surviving animals were moved to fresh water. Nominal glyphosate concentrations of 1.2 to 4.0 ppm initially caused tadpoles paralysis from which they eventually recovered. During the first 24 hours of exposure to 8.0 ppm, all tadpoles either died or were completely paralysed. Furthermore, almost all of the survivors from the first 24 hours of exposure died before the completion of the 96-hour exposure period. Follow-up tests indicated that much of the toxicity could be attributed to the surfactant used in the RoundUp® formulation of glyphosate."	Please see the response to #220-1.
Artley, Dick	"BUENOS AIRES - The herbicide used on genetically modified soy - Argentina's main crop - could cause brain, intestinal and heart defects in fetuses, according to the results of a scientific investigation released Monday. Although the study "used amphibian embryos," the results "are completely comparable to what would happen in the development of a human embryo," embryology professor Andres Carrasco, one of the study's authors, told Efe." "Carrasco said that the research found that "pure glyphosate, in doses lower than those used in fumigation, causes defects ... (and) could be interfering in some normal embryonic development mechanism having to do with the way in which cells divide and die." " "The companies say that drinking a glass of glyphosate is healthier than drinking a glass of milk, but the fact is that they've used us as guinea pigs," he said."	Please see the response to #220-1.
Artley, Dick	"DENVER, Colo.- Recognizing the threat posed by expanding use of dangerous pesticides across 18 western states, competition from invading bullfrogs, nonnative diseases, and loss of wetlands, the U.S. Fish and Wildlife Service will announce tomorrow their conclusion that western populations of the northern leopard frog may warrant protection under the Endangered Species Act." "The use of Roundup (a proprietary herbicide containing glyphosate), which is lethal to amphibians even at recommended levels according to recent studies, also threatens the western leopard frog. Roundup Ready crops (resistant to Roundup so the herbicide can be broadly applied to kill weeds) comprise a significant portion of crop acreage in the	Please see the response to #220-1.

	midwestern United States. In 2004, Roundup Ready soybean crops comprised 89 percent of all soybean crops in Iowa, 82 percent in Minnesota, 92 percent in Nebraska, 82 percent in North Dakota, and 95 percent in South Dakota."	
Artley, Dick	"Eduardo Neaves, a 12-year-old, went swimming in a canal in Coral Gables, Florida that was contaminated with four times the recommended amount of RoundUp herbicide. The child became completely paralyzed, and five years after the incident suffers residual nervous system damage. The EPA, according to this article, in 1985 reported on the case of a 59-year-old woman in Tennessee who has suffered central nervous system damage after exposure to RoundUp. Monsanto's original neurotoxicity studies on RoundUp were ruled invalid by the EPA due to "extensive gaps in the raw data supporting study findings and conclusions. There has been no requirement for a new study on the neurotoxicity of RoundUp."	Please see the response to #220-1.
Artley, Dick	"A group of international scientists has released a report detailing health and environmental hazards from the cultivation of genetically modified (GM) Roundup Ready soy and the use of glyphosate (Roundup®) herbicide. The report, GM Soy: Sustainable? Responsible?,[1] highlights new research by Argentine government scientist, Professor Andrés Carrasco,[2] which found that glyphosate causes malformations in frog and chicken embryos at doses far lower than those used in agricultural spraying. "The findings in the lab are compatible with malformations observed in humans exposed to glyphosate during pregnancy," said Carrasco."	
Artley, Dick	"Three recent studies show that Roundup, which is used by farmers and home gardeners, is not the safe product we have been led to trust. A group of scientists led by biochemist Professor Gilles-Eric Seralini from the University of Caen in France found that human placental cells are very sensitive to Roundup at concentrations lower than those currently used in agricultural application. An epidemiological study of Ontario farming populations showed that exposure to glyphosate, the key ingredient in Roundup, nearly doubled the risk of late miscarriages. Seralini and his team decided to research the effects of the herbicide on human placenta cells. Their study confirmed the toxicity of glyphosate, as after eighteen hours of exposure at low concentrations, large proportions of human placenta began to die. Seralini suggests that this may explain the high levels of premature births and miscarriages observed among female farmers using glyphosate."	Please see the response to #220-1.
Artley, Dick	"Colombia - A Colombian court on Friday ordered the government to suspend immediately aerial spraying of drug crops with the herbicide	Please see the response to #220-1.

	glyphosate, a potential blow to President Andres Pastrana's anti-cocaine offensive. Bogota Judge Gilberto Reyes Delgado, ruling in favor of indigenous groups that had protested the spraying program, said he had asked the government to provide studies on glyphosate's effects on the environment and human health." "Ecuador recently asked Colombia to stop aerial crop spraying near the border the two nations share over fears glyphosate could harm Ecuadoreans' health and damage subsistence crops in the region's jungle towns." "In short, Monsanto's Roundup Ready technology is emerging as an environmental disaster. The question isn't why a judge demanded an environmental impact study of Roundup Ready sugar beets in 2010; it's that no one did so in 1996 before the technology was rolled out. After all, the Union of Concerned Scientists was already quite, well, concerned back then." "As I wrote in June, rather than spark a reassessment of the wisdom of relying on toxic chemicals, the failure of Roundup Ready has the U.S. agricultural establishment scrambling to intensify chemical use. Companies like Dow Agriscience are dusting off old, highly toxic poisons like 2, 4-D and promoting them	
Artley, Dick	as the "answer" to Roundup's problems."	Thisa is an opinion piece about the use of Roundup Ready GMO crops and has no relevance to the 4FRI project.
Artley, Dick	"Glyphosate is no more than slightly toxic to fish, and practically non-toxic to amphibians (McComb 1990) and aquatic invertebrate animals." (page 4) "For glyphosate and its formulations, findings are from studies conducted by the manufacturer. These studies have been presented to EPA to support product registration, but may not be available to the public. (page 5) "Since the 1988 rating, EPA has concluded that glyphosate should be classified as having evidence of noncarcinogenicity for humans. There was no convincing evidence of carcinogenicity in new studies in two animal species (Dykstra and Ghali 1991). (page 7)	This particular citation states the "EPA has concluded that glyphosate should be classified as having evidence of noncarcinogenicity for humans" and "no convincing evidence of carcinogenicity... in two animal species." This supports the limited use of glyphosate-based herbicides as outlined in the DEIS along with the restrictions and extra protective measures in Appendix B - Design Features, Best Management Practices, Required Protection Measures, and Mitigation Measures of the weed EIS. BMP B15 (page 570 of 4FRI DEIS) incorporates the weeds mitigation measures (appendix B of the weed EIS) in their entirety.
Artley, Dick	"Two new studies indicate that Monsanto's herbicide, Roundup, is a hormone-disruptor and is associated with birth defects in humans. Farm families that applied pesticides to their crops in Minnesota were studied to see if their elevated exposure to pesticides caused birth defects in their children. The study found that two kinds of pesticides -- fungicides and the herbicide Roundup -- were linked to statistically significant increases in birth defects. Roundup was linked to a 3-fold increase in neurodevelopmental (attention deficit)	Please see the response to #220-1.

	disorders. [EHP Supplement 3, Vol. 110 (June 2002), pgs. 441-449.] "A recent test tube study reveals that Roundup can severely reduce the ability of mouse cells to produce hormones. Roundup interferes with a fundamental protein called StAR (steroidogenic acute regulatory protein). The StAR protein is key to the production of testosterone in men (thus controlling male characteristics, including sperm production) but also the production of adrenal hormone (essential for brain development), carbohydrate metabolism (leading to loss or gain of weight), and immune system function. The authors point out that "a disruption of the StAR protein may underlie many of the toxic effects of environmental pollutants." [EHP Vol. 108, No. 8 (August 2000), pgs. 769-776.]" "Approved" Herbicide Containers does not Assure Safety Herbicide Safety Testing Opposing View #69 - "Tests done on glyphosate to meet registration requirements have been associated with fraudulent practices. Laboratory fraud first made headlines in 1983 when EPA publicly announced that a 1976 audit had discovered "serious deficiencies and improprieties" in toxicology studies conducted by Industrial Biotest Laboratories (IBT).44 Problems included "countless deaths of rats and mice that were not reported," "fabricated data tables," and "routine falsification of data."44 IBT was one of the largest laboratories performing tests in support of pesticide registrations.44 About 30 tests on glyphosate and glyphosate-containing products were performed by IBT, including 11 of the 19 chronic toxicology studies.45 A compelling example of the poor quality of IBT data comes from an EPA toxicologist who wrote, "It is also somewhat difficult not to doubt the scientific integrity of a study when the IBT stated that it took specimens from the uteri (of male rabbits) for histopathological examination."46 (Emphasis added.) In 1991, laboratory fraud returned to the headlines when EPA alleged that Craven Laboratories, a company that performed contract studies for 262 pesticide companies including Monsanto, had falsified test results.47 "Tricks" employed by Craven Labs included "falsifying laboratory notebook entries" and "manually manipulating scientific equipment to produce false reports."48 Roundup residue studies on plums, potatoes, grapes, and sugarbeets	
Artley, Dick	were among the tests in question.49 The following year, the	Please see the response to #220-1.

	owner/president of Craven Laboratories and three employees were indicted on 20 felony counts. A number of other employees agreed to plead guilty on a number of related charges.50 The owner was sentenced to five years in prison and fined $50,000; Craven Labs was fined 15.5 million dollars, and ordered to pay 3.7 million dollars in restitution.48 Although the tests of glyphosate identified as fraudulent have been replaced, these practices cast shadows on the entire pesticide registration process." "In 2004 the "Counterpart Regulations," strongly supported by industry, were proposed to streamline EPA's pesticide review process at the expense of the most vulnerable life forms in our country, Endangered and Threatened Species aka Listed Species (1,265 species are "Listed"). The critical change these regulations bring about is elimination of the requirement for consultations with wildlife experts at the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) by EPA reviewers evaluating adverse impacts of pesticides on Listed Species and their habitats. RCC opposed the Counterpart Regulations with comments, but, sadly, the Regulations were issued in final form on July 29, 2004, despite our objections. Over 125,000 public comments were received by the Fish and Wildlife Service, and they ran 2 to 1 against the Counterpart Regulations. RCC Insight: Apparently, the public's concerns did not make a difference to the people at FWS and NMFS, or did they? We wonder whether the scientists involved with protecting wildlife at both "Services" would want to be bringing their experience and knowledge to bear on decisions made by EPA with respect to pesticides, if it were up to them. Perhaps they would prefer to be part of the evaluation process and they do not concur with finalizing the Counterpart Regulations. However, the fact is that decision-makers, by finalizing these changes, support an action that will weaken Endangered Species' protection from poisoning and habitat degradation due to pesticides. This latest environmental rollback can mean increasingly hazardous conditions in rivers, lakes and wetlands. A further risk is weakening of the Endangered Species Act itself. (Text of our "Comments" is available through our website -	
Artley, Dick	- rachelcarsoncouncil.com)" "Species from Pesticides - Weakened"	Please see the response to #220-1.
Artley, Dick	"Used in yards, farms and parks throughout the world, Roundup has	Please see the response to #220-1.

Artley, Dick	long been a top-selling weed killer. But now researchers have found that one of Roundup's inert ingredients can kill human cells, particularly embryonic, placental and umbilical cord cells. Until now, most health studies have focused on the safety of glyphosate, rather than the mixture of ingredients found in Roundup. But in the new study, scientists found that Roundup's inert ingredients amplified the toxic effect on human cells-even at concentrations much more diluted than those used on farms and lawns. One specific inert ingredient, polyethoxylated tallowamine, or POEA, was more deadly to human embryonic, placental and umbilical cord cells than the herbicide itself - a finding the researchers call "astonishing." "The research team suspects that Roundup might cause pregnancy problems by interfering with hormone production, possibly leading to abnormal fetal development, low birth weights or miscarriages. Monsanto, Roundup's manufacturer, contends that the methods used in the study don't reflect realistic conditions and that their product, which has been sold since the 1970s, is safe when used as directed. Hundreds of studies over the past 35 years have addressed the safety of glyphosate. "Roundup has one of the most extensive human health safety and environmental data packages of any pesticide that's out there," said Monsanto spokesman John Combest. "It's used in public parks, it's used to protect schools. There's been a great deal of study on Roundup, and we're very proud of its performance." The EPA considers glyphosate to have low toxicity when used at the recommended doses. "Risk estimates for glyphosate were well below the level of concern," said EPA spokesman Dale Kemery. The EPA classifies glyphosate as a Group E chemical, which means there is strong evidence that it does not cause cancer in humans." "However, the U.S. government regulatory agencies seem to have given Monsanto a long rope. The clout Monsanto enjoys in the U.S. government is by no means incidental. According to the Organic Consumers Association, Clarence Thomas, before being the Supreme Court Judge who put George W. Bush in office (in his first term), was a Monsanto lawyer; Anne Veneman, the U.S. Secretary of Agriculture, was on the board of directors of Monsanto's Calgene Corporation; Donald Rumsfeld, the Secretary of Defence, was on the	There is nothing related to the 4FRI project in this article.

	board of directors of Monsanto's Searle Pharmaceuticals; Secretary of Health Tommy Thompson received $50,000 in donations from Monsanto during his winning campaign for Wisconsin's governorship; and the two Congressmen who received the most donations from Monsanto during the last election were Larry Combest (Chairman of the House Agricultural Committee) and John Ashcroft (the Attorney-General)." "A recent study which shows clear links between exposure to the herbicide glyphosate and non-Hodgkin's lymphoma (NHL), a form of cancer that afflicts the lymphatic system, has caused worldwide concern over the safety of the herbicide on humans. The study was conducted by eminent oncologists Dir. Lennart Hardell and Dir. Mikael Eriksson of Sweden and published in the journal Cancer by the American Cancer Society on March 15." "Monsanto's Argument: Previous evaluations conducted by the US Environmental Protection Agency (EPA) and the World Health Organization (WHO) suggest that glyphosate is not a mutagenic or carcinogenic. WHO and the Food and Agriculture Organization (FAO) have approved the safety of glyphosate residues in genetically-engineered Roundup Ready soyabeans. PAN's Counter Argument: The EPA and WHO evaluations were done more than five years ago and based mainly on data submitted to them by Monsanto. These evaluations did conclude that "there is no evidence of mutagenicity or carcinogenicity" based on the available data, but they do not support definitive assertions that glyphosate "is not mutagenic or carcinogenic". Previous EPA and WHO evaluations which made similar claims for other chemicals had to be revised as new evidence came to light. The establishment of the WHO's Acceptable Daily Intake (ADI) is based on limited studies using limited parameters which do not account for vulnerable groups such as children, the elderly, the sick and other groups that	
Artley, Dick	might have increased susceptibility to glyphosate exposure."	Please see the response to #220-1.
Artley, Dick	To protect our health, the U.S. Environmental Protection Agency (EPA) sets maximum legal residue levels for every pesticide, for dozens of crops. But a new study in the respected journal Toxicology has shown that, at low levels that are currently legal on our food, Roundup could cause DNA damage, endocrine disruption and cell death. The study, conducted by French researchers, shows	Please see the response to #220-1.

	glyphosate-based herbicides are toxic to human reproductive cells." "Solvents and surfactants, legally considered 'inert ingredients,' are mixed with glyphosate in products such as Roundup weed killer to create chemical formulations that increase mobility and more direct access to the cells. 'Those same factors that aid penetration into a plant, also aid penetration into the skin,' says Vincent Garry, professor emeritus of pathology at the University of Minnesota. 'These chemicals are designed to kill cells.' " "Herbicide manufacturers are subject to fewer rules in the testing of inert ingredients than they are for active ingredients, explains Caroline Cox, research director at the Center for Environmental Health in Oakland, Calif. 'The tests the EPA requires for inert ingredients cover only a small range of potential health problems,' Cox says. 'Testing for birth defects, cancer and genetic damage are required only on the active ingredients. But we're exposed to both.' " " 'Our bodies are gigantic spider webs of chemical communications that work in the parts-per-trillion range,' says Warren Porter, professor of zoology and environmental toxicology at the University of Wisconsin. 'When you put so-called 'insignificant' amounts of toxic chemicals into the mix, you have a molecular bull in a china shop. The possibilities for impact are endless.' " "Glyphosate is of relatively low oral and dermal acute toxicity. It has been placed in Toxicity Category III for these effects (Toxicity Category I indicates the highest degree of acute toxicity, and Category IV the lowest). The acute inhalation toxicity study was waived because glyphosate is nonvolatile and because adequate inhalation studies with end-use products exist showing low toxicity." (Pg. 2) "Glyphosate does not cause mutations." (Pg. 2) "EPA conducted a dietary risk assessment for glyphosate based on a worst-case risk scenario, that is, assuming that 100 percent of all possible commodities/acreage were treated, and assuming that tolerance-level residues remained in/on all treated commodities. The Agency concluded that the chronic dietary risk posed by glyphosate food uses is minimal." (Pg. 3) "Occupational and residential exposure to glyphosate can be expected based on its currently registered uses. However, due to glyphosate's low acute toxicity and the absence of	
Artley, Dick	other toxicological concerns (especially carcinogenicity),	Please see the response to #220-66.

	occupational and residential exposure data are not required for reregistration." (Pg. 3) "Glyphosate is no more than slightly toxic to birds and is practically nontoxic to fish, aquatic invertebrates and honeybees. Due to the presence of a toxic inert ingredient, some glyphosate end-use products must be labeled, 'Toxic to fish,' if they may be applied directly to aquatic environments. Product labeling does not preclude off-target movement of glyphosate by drift. EPA therefore is requiring three additional terrestrial plant studies to assess potential risks to nontarget plants. EPA does not expect that most endangered terrestrial or aquatic organisms will be affected by the registered uses of glyphosate." (Pg. 4) "Based on current data, EPA has determined that the effects of glyphosate on birds, mammals, fish and invertebrates are minimal." (Pg. 5) "Regulatory Conclusion The use of currently registered pesticide products containing the isopropylamine and sodium salts of glyphosate in accordance with the labeling specified in this RED will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, all uses of these products are eligible for reregistration." (Pg. 6) "The findings of Richard et al. (2005) are an important addition to our understanding that the health and environmental effects of formulated pesticide products are not fully reflected in tests conducted on the active ingredient(s) alone. It has been long known that the adjuvants (commonly and misleadingly called "inert" ingredients) may be toxic and may enhance or supplement the toxic effects of the active pesticidal ingredient. In the case of glyphosate-containing products, this phenomenon was well demonstrated in the data submitted to the (EPA) by the registrant (Monsanto), and summarized by the U.S. EPA in the Reregistration Eligibility Document (RED) for glyphosate (U.S. EPA 1993). For example, based on the registrant's own tests of acute toxicity to freshwater fish, the U.S. EPA classified technical grade glyphosate as "slightly toxic" to "practically non-toxic" and formulated products ranged from "moderately toxic" to "practically non-toxic." Tested alone, the surfactant adjuvant (identified as "inert") was "highly toxic" to "slightly toxic." Similar differences were reported in tests of acute	
Artley, Dick	toxicity to freshwater invertebrates. Based in part on the data in the	Please see the response to #220-1.

Artley, Dick	glyphosate RED (U.S. EPA 1993), the New York State Attorney General's office successfully pursued an action against Monsanto in 1996 (Attorney General of the State of New York 1996). At that time, Monsanto was making advertising claims about the toxicity of the Roundup products based on data from tests on the active ingredient alone. Such claims are scientifically unfounded and inherently deceptive. The Attorney General's action was facilitated by the availability of at least some limited information about the inert ingredients and their toxicity. That same sort of information enabled Richard et al. (2005) to conduct their study. Unfortunately, that is not always the case, and for many pesticide products, little or no information about the identity of inert ingredients is publicly available. Registrants are generally required to conduct acute toxicity tests on formulated products, but they traditionally conduct chronic toxicity tests on the active ingredient alone. Even when formulated products are tested, the identity of inert ingredients is rarely revealed in the open literature, publicly available regulatory documents, or product labels. Therefore, independent research is stymied, and the public is ill-informed in the marketplace." "FACT: The EPA (Environmental Protection Agency) does not test pesticides for safety. It relies on the manufacturers' test data to make judgments. Recent probes have found that the experiments on which these data have been based, have been designed to show only what the manufacturer would like them to show. This criticism of self-serving misrepresentation can be aimed equally validly at irresponsible experimenters bent on demonstrating toxicity of a given pesticide. It seems that however this problem is approached, the EPA needs to take more affirmative action and responsibility. This is not likely to happen, as the EPA's research program increasingly relies on corporate joint venture, according to agency documents obtained by Public Employees for Environmental Responsibility (PEER). Indeed, a study by the Government Accountability Office (the investigative arm of Congress - the same people who first told us of the $640 toilet seats and $1,000 hammers purchased with Department of Defense money), in April 2005, concluded that the EPA lacks safeguards to "evaluate or manage potential conflicts of interest" in corporate research agreements, as	Please see the response to #220-1.

	they are taking money from corporations that they are supposed to be regulating."	
Artley, Dick	"FACT: The primary focus of the Federal Insecticide, Fungicide, and Rodenticide Act, originally enacted in 1947, was to provide federal control of pesticide distribution, sale, and use. The act has been amended many times over the years. One of these amendments permitted manufacturers protection of trade secrets. It is under these provisions that manufacturers circumvent a law that originally intended all information to be known - at least by the EPA. The fact that today, with mass spectrometers, chemistry can determine the makeup of the inert ingredients, leaves only the end consumer in the dark. In 1990 the Office of the Attorney General of New York filed a request that all inert ingredients in pesticides be made public. The request was repeated a number of times through the decade, to no avail. Sixteen years later, in August of 2006, the attorneys general of 14 states have filed a similar petition to the EPA. This time the EPA is obliged to respond within a given time period."	Please see the response to #220-1.
Artley, Dick	"O' Neill concluded: 'The EPA when authorising Monsanto's field trials for Roundup-ready sugar beet did not consider the issue of glyphosate. They considered this to be the remit of the Pesticides Control Service of the Department of Agriculture. Thus nobody has included the effects of increasing the use of glyphosate in the risk/benefit analysis carried out. It is yet another example of how regulatory authorities supposedly protecting public health have failed to implement the 'precautionary principle' with respect to GMOs.' "	Please see the response to #220-1.
Artley, Dick	"Glyphosate-containing products are acutely toxic to animals, including humans. Symptoms include eye and skin irritation, cardiac depression, gastrointestinal pain, vomiting, and accumulation of excess fluid in the lungs. The surfactant used in a common glyphosate product (Roundup) is more acutely toxic than glyphosate itself; the combination of the two is yet more toxic." "Tests done on glyphosate to meet registration requirements have been associated with fraudulent practices." "Laboratory fraud first made headlines in 1983 when EPA publicly announced that a 1976 audit had discovered "serious deficiencies and improprieties" in toxicology studies conducted by Industrial Biotest Laboratories (IBT).44 Problems	Please see the response to #220-1.

	included "countless deaths of rats and mice that were not reported," "fabricated data tables," and "routine falsification of data." "44 "IBT was one of the largest laboratories performing tests in support of pesticide registrations.44 About 30 tests on glyphosate and glyphosate-containing products were performed by IBT, including 11 of the 19 chronic toxicology studies.45 A compelling example of the poor quality of IBT data comes from an EPA toxicologist who wrote, "It is also somewhat difficult not to doubt the scientific integrity of a study when the IBT stated that it took specimens from the uteri (of male rabbits) for histopathological examination." "46 (Emphasis added.) "In 1991, laboratory fraud returned to the headlines when EPA alleged that Craven Laboratories, a company that performed contract studies for 262 pesticide companies including Monsanto, had falsified test results.47 "Tricks" employed by Craven Labs included "falsifying laboratory notebook entries" and "manually manipulating scientific equipment to produce false reports."48 Roundup residue studies on plums, potatoes, grapes, and sugarbeets were among the tests in question." "49 "The following year, the owner/president of Craven Laboratories and three employees were indicted on 20 felony counts. A number of other employees agreed to plead guilty on a number of related charges.50 The owner was sentenced to five years in prison and fined $50,000; Craven Labs was fined 15.5 million dollars, and ordered to pay 3.7 million dollars in restitution."48 "EPA Investigates Monsanto An internal memorandum by an official of the U.S. Environmental Protection Agency [EPA], has accused EPA of conducting a "fraudulent" criminal investigation of Monsanto, the St. Louis chemical corporation. [1] The 30-page memo, from William Sanjour to his supervisor, David Bussard, dated July 20, 1994, describes a two-year-long criminal investigation of Monsanto by EPA's Office of Criminal Investigation (OCI). The Sanjour memo says EPA opened its investigation on August 20, 1990 and formally closed it on August 7, 1992. "However, the investigation itself and the basis for closing the investigation were fraudulent," the Sanjour memo says. According to the Sanjour memo: * EPA's investigation of Monsanto was precipitated by a memo dated February 23, 1990,	
Artley, Dick	from EPA's Dr. Cate Jenkins to Raymond Loehr, head of EPA's Science	Please see the response to #220-1.

Advisory Board. * The Jenkins memo said that EPA had set dioxin standards relying on flawed Monsanto-sponsored studies of Monsanto workers exposed to dioxin, studies that had showed no cancer increases among heavily exposed workers. * Attached to the Jenkins memo was a portion of a legal brief filed by the plaintiffs as part of a trial known as Kemner v. Monsanto, in which a group of citizens in Sturgeon, Missouri had sued Monsanto for alleged injuries they had suffered during a chemical spill caused by a train derailment in 1979. * The Jenkins memo had not requested a criminal investigation; instead Jenkins had suggested the need for a scientific investigation of Monsanto's dioxin studies. But in August 1990, EPA's Office of Criminal Investigation (OCI) wrote a 7-page memo recommending that a "full field criminal investigation be initiated by OCI." * Plaintiffs in the Kemner suit made the following kinds of allegations (which we quote verbatim from the Sanjour memo): "Monsanto failed to notify and lied to its workers about the presence and danger of dioxin in its chlorophenol plant, so that it would not have to bear the expense of changing its manufacturing process or lose customers;... "Monsanto knowingly dumped 30 to 40 pounds of dioxin a day into the Mississippi River between 1970 and 1977 which could enter the St. Louis food chain; "Monsanto lied to EPA that it had no knowledge that its plant effluent contained dioxin; "Monsanto secretly tested the corpses of people killed by accident in St. Louis for the presence of dioxin and found it in every case;... "Lysol, a product made from Monsanto's Santophen, was contaminated with dioxin with Monsanto's knowledge." [The Sanjour memo says that, at the time of the contamination, "Lysol (was) recommended for cleaning babies' toys and for other cleaning activities involving human contact."] "The manufacturer of Lysol was not told about the dioxin by Monsanto for fear of losing his business; "Other companies using Santophen, who specifically asked about the presence of dioxin, were lied to by Monsanto;... "Shortly after a spill in the Monsanto chlorophenol plant, OSHA measured dioxin on the plant walls. Monsanto conducted its own measurements, which were higher than OSHA's, but they issued a press release to the public and they lied to OSHA and their workers saying they had failed to confirm OSHA's findings; "Exposed Monsanto workers were not told of the

	presence of dioxin and were not given protective clothing even though the company was aware of the dangers of dioxin; "Even though the Toxic Substances Control Act requires chemical companies to report the presence of hazardous substances in their products to EPA, Monsanto never gave notice and lied to EPA in reports; "At one time Monsanto lied to EPA saying that it could not test its products for dioxin because dioxin was too toxic to handle in its labs."...	
Artley, Dick	"A study by French researchers at the University of Caen of glyphosate residue discovered that the inert ingredients in the herbicide (solvents, preservatives, surfactants) increased the toxic effect on human cells. According to the researchers, glyphosate residue can cause birth defects. "This clearly confirms that the [inert ingredients] in Roundup formulations are not inert," wrote the study authors. "Moreover, the proprietary mixtures available on the market could cause cell damage and even death [at the] residual levels" found on Roundup-treated crops." "Another study by Argentine scientists also found that glyphosate can cause birth defects at doses considerably lower than what is commonly used on crops, in this case, soybeans. The researchers injected amphibian embryo cells with glyphosate diluted to a concentration 1,500 times less than what is used commercially. The embryos grew into tadpoles with obvious birth defects." "A 2001 study by Swedish oncologists discovered links between non-Hodgkin's lymphoma and glyphosate. The Swedish researchers found that Swedish people with non-Hodgkin's lymphoma were 2.3 times more likely to be exposed to glyphosate. Monsanto spokesperson John Combest defended the safety of Roundup. "Roundup has one of the most extensive human health safety and environmental data packages of any pesticide that's out there. It's used in public parks, it's used to protect schools. There's been a great deal of study on Roundup, and we're very proud of its performance." "	Please see the response to #220-1.
Artley, Dick	"Over twenty years ago, the dangers of Monsanto's glyphosate as well as its associated GMOs were known scientifically to cause human health difficulties and Swedish researchers years ago in the Journal 'Cancer' noted glyphosate was connected to human cancer. Anyway, many scientists and public health workers researching it	This article is in reference to GMO's and is out of the scope of the 4FRI project.

	were fired. It's a mad empire's rush--the U.S empire and its corporate proxies--to desire (hell, the reality of) to own the world's food and dominate the whole world. It is destroying thousands of years of biodiversity security in the process. And Monsanto's empire of glyphosate is in virtually everything in the USA and worldwide. One foolish company, one corrupt federal government of the USA. Everyone should learn more about Monsanto in the film "The World According to Monsanto." (90 minutes). Monsanto's corporate contract should be revoked for endangering world health and killing off global crop biodiversity of thousands of years of work destroyed in one generation--in the mad rush to dominate the whole world's biodiversity. Monsanto and the USA will go down in history as the organizations that caused most biological devastation and human suffering in human history."	
Artley, Dick	BUENOS AIRES, Apr 15 , 2009 (IPS) - Glyphosate, the herbicide used on soybeans in Argentina, causes malformations in amphibian embryos, say scientists here who revealed the findings of a study that has not yet been published." "The observed deformations are consistent and systematic," Professor Andrés Carrasco, director of the Laboratory of Molecular Embryology at the University of Buenos Aires medical school and lead researcher on the National Council of Scientific and Technical Research (CONICET), told the Inter Press Service news agency IPS. Reduced head size, genetic alterations in the central nervous system, an increase in the death of cells that help form the skull, and deformed cartilage were effects that were repeatedly found in the laboratory experiments, said the biologist. The news was reported Monday by the Argentine newspaper Página 12. Monsanto's head of communications in Argentina, Fernanda Pérez Cometto, told IPS that the company has "several studies that show that the herbicide is harmless to humans, animals and the environment."	Please see the response to #220-1.
Artley, Dick	"It's amazing how many organics people still think it's OK to just use a bit of Roundup on those weeds in the bush or the driveway, or …. of course, not on the food, but the bush, that's OK isn't it? Well, no, actually it isn't, and here's why: Roundup and various other formulations of the active ingredient glyphosate, have the potential to cause serious health and environmental effects, and have caused	Please see the response to #220-1.

	some severe poisoning problems. Thorough PR by the developer of Roundup, Monsanto, has resulted in the widespread belief that glyphosate is 'safe'. Registration processes have generally supported this attitude, and there are no national or international bans. However, independent scientific studies and widespread poisonings in Latin America resulting from aerial application are beginning to reveal the true effects of the world's most widely used herbicide." Research on genetically modified seeds is still published, of course. But only studies that the seed companies have approved ever see the light of a peer-reviewed journal. In a number of cases, experiments that had the implicit go-ahead from the seed company were later blocked from publication because the results were not flattering. "It is important to understand that it is not always simply a matter of blanket denial of all research requests, which is bad enough," wrote Elson J. Shields, an entomologist at Cornell University, in a letter to an official at the Environmental Protection Agency (the body tasked with regulating the environmental consequences of genetically modified crops), "but selective denials and permissions based on industry perceptions of how 'friendly' or 'hostile' a particular scientist may be toward [seed-enhancement] technology." Shields is the spokesperson for a group of 24 corn insect scientists that opposes these practices. Because the scientists rely on the cooperation of the companies for their research - they must, after all, gain access to the seeds for studies - most have chosen to remain anonymous for fear of reprisals. The group has submitted a statement to the EPA protesting that "as a result of restricted access, no truly independent research can be legally conducted on many critical questions regarding the technology." It would be chilling enough if any other type of company were able to prevent independent researchers from testing its wares and reporting what they find - imagine car companies trying to quash head-to-head model comparisons done by Consumer Reports, for example. But when scientists are prevented from examining the raw ingredients in our nation's food supply or from testing the plant material that covers a large portion of the country's agricultural land, the restrictions on free inquiry become	
Artley, Dick	dangerous.	Please see the response to #220-1.
Artley, Dick	"France's highest court has ruled that U.S. agrochemical giant	Please see the response to #220-1.

	Monsanto had not told the truth about the safety of its best-selling weed-killer, Roundup. The court confirmed an earlier judgment that Monsanto had falsely advertised its herbicide as "biodegradable" and claimed it "left the soil clean." Roundup is the world's best-selling herbicide. French environmental groups had brought the case in 2001 on the basis that glyphosate, Roundup's main ingredient, is classed as "dangerous for the environment" by the European Union. In the latest ruling, France's Supreme Court upheld two earlier convictions against Monsanto by the Lyon criminal court in 2007, and the Lyon court of appeal in 2008, the AFP news agency reports. Monsanto already dominates America's food chain with its genetically modified seeds. Now it has targeted milk production. Just as frightening as the corporation's tactics, including ruthless legal battles against small farmers, is its decades-long history of toxic contamination." "Monsanto created Roundup in the 1970's to kill weeds and has since catapulted this product to be the world's number one selling herbicide. Before the patent on Roundup was set to expire in 2000, Monsanto needed a surefire way to keep the profits of Roundup from bottoming out. Monsanto quickly began purchasing the majority of the world's seed companies while simultaneously creating GMOs that farmers needed to sign contractual agreements to only use Roundup. Subsequently, revenue from Roundup never dropped and in fact topped more than $4 billion in 2008, up 59% from 2007 [2]. GM-soy is estimated to be present in up to 70% of all food products found in US supermarkets, including cereals, breads, soymilk, pasta and most meat (as animals are fed GM-soy feed). Although Monsanto has consistently relied on industry-funded data to declare the safety of GM-soy and glyphosate, objective research published in peer-reviewed journals tells another story. Toxicity of Glyphosate A recently published study by Italian researchers [3] examined the toxicity of four popular glyphosate based herbicide formulations on human placental cells, kidney cells, embryonic cells and neonate umbilical cord cells and surprisingly found total cell death of each of these cells within 24 hours. The researchers reported several mechanisms by which the herbicides caused the	
Artley, Dick	cells to die including: cell membrane rupture and damage,	Please see the response to #220-1.

Artley, Dick	mitochondrial damage and cell asphyxia. Following these findings, the researchers tested G, AMPA and POEA by themselves and concluded that, "It is very clear that if G, POEA, or AMPA has a small toxic effect on embryonic cells alone at low levels, the combination of two of them at the same final concentration is significantly deleterious." "If you're still not convinced that Roundup is a highly toxic and persistent pesticide, read on, while at the same time remembering the other contributions that Monsanto has made to society such as: Saccharin, Astroturf, agent orange, dioxin, sulphuric acid, polychlorinated biphenyls (PCBs), plastics and synthetic fabrics, research on uranium for the Manhattan Project that led to the construction of nuclear bombs, styrene monomer, an endless line of pesticides and herbicides (Roundup), rBGH (recombinant bovine growth hormone that makes cows ill), genetically engineered crops (corn, potatoes, tomatoes, soy beans, cotton), and it's most significant product to date; Lies, Factual Distortions and Omissions. Here's one of the distortions that Monsanto had on its website a while back. 'Sustainability - the idea that the resources and people of this world are finite. That for any business decision we make, we must consider the effect it will have on us and our children. That the products we make must not use up all of a natural resource, or even worse, contaminate what is left behind.' "	Thank you for the summary of Monsanto products. This comment has no application to the 4FRi project. With that being said, the DEIS does identify the BMP's for the limited use of herbicides. Please see response to #220-1.
Artley, Dick	"The U.S. response (to questions about biotech crop safety) has been an extremely patronizing one. They say 'We know best, trust us,'" added Gurian-Sherman, now a senior scientist at the Union of Concerned Scientists, a nonprofit environmental group." "So far, that confidence has been lacking. Courts have cited regulators for failing to do their jobs properly and advisers and auditors have sought sweeping changes." "The developers of these crop technologies, including Monsanto and its chief rival DuPont, tightly curtail independent scientists from conducting their own studies. Because the companies patent their genetic alterations, outsiders are barred from testing the biotech seeds without company approvals." "The agreements disallow any research that is not first approved by the companies. "No truly independent research can be legally conducted on many critical questions regarding the	This comment has no application to the 4FRI project. With that being said, the DEIS does identify the BMP's for the limited use of herbicides. Please see response to #220-1.

Artley, Dick	technology," the scientists said in their statement." "Outside researchers have also raised concerns over the years that glyphosate use may be linked to cancer, miscarriages and other health problems in people." "Defining Toxic Asbestos is an extreme example, which I use here and in my book Pick Your Poison: How Our Mad Dash to Chemical Utopia is Making Lab Rats of Us All to make a point, but many other "nontoxic" products could be full of toxic chemicals. I'm hoping this essay leaves you with a general distrust of the nontoxic label, both in the past and currently. When you see "nontoxic" on a product, keep the following facts in mind: * "Nontoxic" can still legally mean that there are no immediate, acute hazards as determined by the LD50 and LC50 tests. * "Nontoxic" may mean there are little or no chronic data available on the substance. If the substance is not acutely toxic, and one can't prove it is toxic in the long term, many manufacturers feel that they have the right to call it nontoxic. Even if there are studies showing that the substance is toxic, manufacturers in the United States have traditionally waited for absolute, unequivocal proof, which in most cases is never available because we don't study our chemicals. * An art material is "nontoxic" if a toxicologist paid by the manufacturer decides it is safe. The dramatic failure in this labeling procedure was illustrated with the lead ceramic glazes and asbestos-containing materials such as talc. Asbestos-containing talcs are still found in some art and craft materials today. Some art materials that have never been evaluated by a toxicologist may be labeled "nontoxic" illegally due to weak enforcement of the art materials labeling law. For example, in 1995, a cameraman and a reporter from Channel 9 in New York went with me to a major art materials outlet. That night on the evening news, we showed viewers about a dozen imported products that did not conform to the law, some labeled "nontoxic," which were being sold illegally. This is still true today, and a little research will lead you to many sources of noncompliant "nontoxic" products. * Labeling of ordinary consumer products is pretty much up to the manufacturer and its paid advisers. Because there is no enforcement mechanism in the regulations for the chronic hazard labeling of ordinary consumer products, there is not much incentive to provide warnings. * There is no regulatory	This comment has no application to the 4FRI project. With that being said, the DEIS does identify the BMP's for the limited use of herbicides. Please see response to #220-1.

	requirement to warn consumers about damage to most of the body's organs, such as the lungs, the liver, and the kidneys. Only four types of chronic hazards are covered by the Federal Hazardous Substances Act regulations. These are cancer, and developmental, reproductive, and neurological damage." Monsanto's Claims Independent Research Findings Roundup has a low irritational potential for eye and skin and otherwise is not a risk to human health. Roundup is amongst the top most reported pesticides causing poisoning incidents (mainly skin irritation) in several countries. It also causes a range of acute symptoms including, recurrent eczema, respiratory problems, elevated blood pressure, allergic reactions. Roundup does not cause any adverse reproductive effects In laboratory tests on rabbits glyphosate caused long lasting, harmful effects on semen quality and sperm counts. Roundup is not mutagenic in mammals. DNA damage has been observed in laboratory experiments in mice organs and tissue. Roundup is environmentally safe. * In the agricultural environment, glyphosate is toxic to some beneficial soil organisms, beneficial arthropod predators, and increases crops' susceptibility to diseases. * Sub-lethal doses of glyphosate from spray drift damages wildflower communities and can affect some species up to 20 metres away from the sprayer. * The use of glyphosate in arable areas may cause dieback in hedgerow trees. Roundup is rapidly inactivated in soil and water. * Glyphosate is very persistent in soils and sediments. * Glyphosate inhibited the formation of nitrogen fixing nodules on clover for 120 days after treatment. * Glyphosate residues were found in lettuce, carrot, and barley when planted a year after glyphosate was applied. Roundup is immobile and does not leach from soils. * Glyphosate can readily desorb from soil particles in a range of soil types. It can be extensively mobile and leach to lower soil layers. * Glyphosate can be carried by soil particles suspended in run off. Roundup does not contaminate drinking water when used by local authorities on hard surfaces. In the UK, levels of glyphosate above the EU limit have been detected by the Welsh Water Company every year since 1993. The Drinking Water Inspectorate recommends that glyphosate be monitored, particularly, in areas where it is used by local authorities on hard surfaces. It is nearly impossible for	
Artley, Dick		Please see the response to #220-1.

	glyphosate resistance to evolve in weeds. In 1996, glyphosate resistant ryegrass was discovered in Australia. Outcrossing in oilseed rape crops (and the transfer of genes from transgenic crops) occurs over a short distance and can be easily managed. The densities of oil seed rape pollen are much higher and their dispersal patterns differ from around large fields compared to those found in experimental plots. Wind dispersal of pollen occurs over much greater distances and at higher concentrations than predicted by experimental plots. Significant levels of gene flow from transgenic oil seed crops is inevitable. Roundup Ready crops will reduce levels of herbicide use. Herbicide resistant crops will intensify and increase dependency on herbicide use in agriculture rather than lead to any significant reductions. A variety of herbicides will have to be reintroduced to control glyphosate resistant volunteers, feral populations of crops and resistant weeds. Source: References cited in Health and Environmental Impacts of Glyphosate, (Details available from the Pesticides Trust [now PAN UK]).	
Artley, Dick	"When Sofía lost her newborn, she soon realized that such losses were all-too-common in her small community of Ituzaingó Annex. Aerial spraying with Monsanto's herbicide RoundUp had climbed dramatically in the region as the number of acres planted with the company's "RoundUp Ready" soy crops grew. Sofía and other concerned mothers went door to door collecting stories about health problems in each family - basically conducting the community's first-ever epidemiological study. "The Mothers of Ituzaingó" discovered the community's cancer rate to be 41 times the national average, and rates of neurological problems, respiratory diseases and infant mortality were astonishingly high. In response, the mothers launched a "Stop the Spraying!" campaign."	Please see the response to #220-1.
Artley, Dick	"But humans are much bigger than insects and the doses to humans are miniscule, right? During critical first trimester development, a human is no bigger than an insect, so there is every reason to believe that pesticides could wreak havoc with the developing brain of a human embryo. But human embryos aren't out in corn fields being sprayed with insecticides and herbicides, are they? A recent study showed that every human tested had the world's most popular pesticide, Roundup, detectable in their urine at concentrations	Please see the response to #220-1.

	between five and twenty times the level considered safe for drinking water. The autism epidemic and the disappearance of bees are just two of many self-imposed disasters from allowing our world, including Utah, to be overwhelmed by environmental toxins. Environmental protection- including the smallest and most vulnerable among us - is human protection."	
Artley, Dick	"A formula seems to have been made to not only ruin the agricultural system, but also compromise the health of millions of people worldwide. With the invent of Monsanto's Roundup Ready crops, resistant superweeds are taking over farmland and public health is being attacked. These genetically engineered crops are created to withstand large amounts of Monsanto's top-selling herbicide, Roundup. As it turns out, glyphosate, the active ingredient in Roundup, is actually leaving behind its residue on Roundup Ready crops, causing further potential concern for public health."	Please see the response to #220-1.
Artley, Dick	The results of independent, unbiased research on glyphosate-containing herbicides indicate this chemical is causing: birth defects, non-Hodgkin's lymphoma, mitochondrial damage, cell asphyxia, miscarriages, attention deficit disorder, endocrine disruption, DNA damage, skin tumors, thyroid damage, hairy cell leukemia, Parkinson disease, premature births, decrease in the sperm count, harm to the immune system in fish, death of liver cells, severe reproductive system disruptions and chromosomal damage. Non-native plants are causing havoc to the native forest ecosystems. However, this does not justify inflicting mammals & birds (including human visitors to the forest) with one of the many physical problems listed above. Fish? Just a minor amount of spray that contact water will kill aquatic life. It's unethical and unprofessional to apply this tragic poison to land owned by other people just because the Forest Service's outdated approval documents say it's OK. There are more costly (yet equally effective) alternatives to deadly herbicides when eradicating non-native plants. Please use them. This is a government expenditure that the public would support. Please read Dan Rather's very recent September 22, 2011 investigative report about the EPA's corrupt approval process of man-made chemicals: http://www.panna.org/blog/dan-rather-pesticides-bees Ask yourself this. Am I willing to subject animals and/or humans to a painful	Please see the response to #220-1.

	cancer death based on 10 year-old USFS data provided to them by the Monsanto Corporation? Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these	
Asselin, Dave	national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI	Thank you for your comment. Please see our response to Letter #19.

	implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Aubin, Louise	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an	Thank you for your comment. Please see our response to Letter #19.

	integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Bacon, Bren	Never in my 65 years have I seen human 'improvements' to Mother Nature bring ANY good. Ever smelled a Ponderosa Tree ? It doesn't smell like a weed to me. I'm sure to the Elk and other wildlife, these trees are cathedrals in wonderful wild realms. I picture your reconstruction like taking a forest and turning it into a gridwork-like housing development. Best put street signs too, because I'm sure the animals will be lost. Lost to the point of extinction if we keep thinking we know best. UG!!!	(147-1) Thank you for your comment.
Bahr, Sandy	Please find attached to this message and pasted below a letter from five conservation organizations commenting on the Draft Environmental Impact Statement for activities connected to the Four Forest Restoration Initiative in the Coconino and Kaibab National Forests. All attachments described in the comment letter are embedded in the PDF document.	(Letter 199) Please see our response to letter 196.
Baierlein, Ralph	Formal comments on the draft EIS for 4FRI appear on the other pages with FoNAF's letterhead. Just to provide you personally with more information about FoNAF, I enclose a copy of our latest newsletter and a copy of a "thank you" note that displays the signs that we have put on all exclosures on the Flagstaff Ranger District.	(72-1) Thank you for taking the time to comment on the 4FRI DEIS.
Baierlein, Ralph	The mission of Friends ofNorthem Arizona Forests (FoNAF) is to support the Forest Service on the ground. Consequently, FoNAF normally refrains from commenting on NEPA documents. The draft EIS for 4FRI, however, warrants an exception. FoNAF has four years of experience with repairing and building some 50 exclosures that protect young aspen on the CNF. Our recommendations may help the Forest Service make good use of funds if a decision is made to construct exclosures (up to 82 miles of fence, as we read in the	(72-2) Thank you for your comment. As you stated, the all the action alternatives include the ability to construct fencing to protect streams, springs, riparian areas, and aspen stands.

	draft). Recommendations 1. Firewood collectors. We were pleased to read that "fencing would occur after [our italics] mechanical and burning treatments." If potential firewood remains after the treatments, we recommend removal to outside the prospective fence line and to a location convenient for loading into a truck so that firewood collectors will have no reason to cut the fence. 2. Preemptive cutting. Cut out dead trees that, when they fall, have a high probability of falling on the fence.[When two large exclosures were constructed in the aftermath of the Hochderffer fire of 1996, the Decision Memo called for cutting dead trees that, when they fell, would likely hit the fence. Apparently that policy was not carried out. Within five years, the fence was a shambles and was removed. The young aspen were browsed to oblivion.] 3. Fence height. Build a fence 8' high. On uneven ground, use two panels of 47" high-tensile woven wire on 10' T-posts. Attach the upper panel to 8' wooden stays 1" below the top. [On flat and open ground, one should consider using one panel of 8' game fence, but the product is extremely heavy (per roll) and is more expensive per 330' of fence than two panels of 47" woven wire. Although the game fence promises lower maintenance costs, the initial cost is probably prohibitively high. 4. Signs. Hang informative signs every 100 yards around the periphery.(FoNAF will be glad to provide text that it has found to be effective in preventing damage.) 5. Size of exclosures. Large exclosures are efficient in the sense that the ratio of perimeter length to area enclosed is less than for small exclosures (ofthe same shape). Complications arise, however, after a fence has been breached by a fallen tree or by humans. The larger the exclosure, the more difficult to ensure that all ungulates that entered through the breach have been pushed out of the exclosure before the breach is closed. Moreover, the longer the perimeter, the more likely that a breach will occur. Our experience extends upward to exclosures of 35 acres and a perimeter of 1.1 miles. Larger exclosures would present worse problems. For example, James Rolf noted major difficulties with an exclosure of 130 acres(your reference: James Rolf, "Aspen Fencing in Northern Arizona: a 15-Year Perspective"). FoNAF does not make a firm numerical recommendation about a maximum	
Baierlein, Ralph		(72-3) Thank you for your comments and recommendations. Your suggestions will be considered during the implementation phase when each site will be evaluated to determine what type of structure would be most effective.

	size. Rather, we urge caution in pursuing the (apparent) economy of large exclosures.	
Bardwell, Avelina	I DO NOT think burning the forest to prevent forest fires is a valid scientific concept. We should not increase carbon dioxide in the air. I see the medical complications caused by air pollution from fires in pulmonary exacerbations and cardiac disease in my patients. Many other tactics could be used and I believe we should rethink our approach to preventing forest fires..	(106-1) Thank you for your comment.
Baric, Leonard	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected,	(58-1) Thank you for your comments. Please see our response to letter #19.

	with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Barris, Elizabeth	lease do NOT burn 1,000,000 acres of land in Arizona or anywhere else or sell anything to lumber companies!!! I am so tired of these companies paying off our government agencies so they can rape and pillage our land and natural resources in order to make a profit. It disgusts me and millions of others. In the face of global warming and other natural disasters, whoever is allowing this disgusting idea to even see the light of day should lose their job.	(80-1) Thank you for taking the time to comment. Please see the purpose and need for the restoration treatments in the DEIS on page 8.
Barritt, Harrison	Please do not go ahead and burn the forest in Arizona, as this will contribuite to a devastation of micro ecosystems as well as contribute toward climate change. This size burn will have lasting impacts on our environment. Please do not go foward with the plan.	(144-1) Thank you for your comment.
Beaty, C. Lee	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife	(186-1) Thank you for your comment. Please see the response to letter #19.

Beety, Nina	species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. It shocks me that something called the Forest Service would slaughter trees and destroy habitat. This is information I received from an accurate source about this project. This type of project is going on all over the country. The Four Forests Restoration Initiative ("4FRI") is the largest yet proposed, totalling more than two million acres in central and eastern Arizona. The first half of the project is in an area around Flagstaff, in the Kaibab and Coconino National Forests. The Forest Service wants to replace the unbroken forest with "a mosaic of interspaces and tree groups"; to eradicate most of the Ponderosa pines, which it considers a "weed"; and to do this by thinning and burning one million acres of Arizona forest, including	(167-1) Thank you for your opinion. Please consider reading the DEIS, particularly chapter 3.

	98% of protected habitat for the Mexican Spotted Owl. In order to permanently alter the landscape, the Forest Service plans to burn every area of the forest every five years, from now on. Before it burns the first time, however, it will invite a logging company from Montana down to harvest 300,000 acres of trees. Is this an environmental engineering experiment? This isn't scientific, and this isn't land stewardship. This is eugenics – some sort of strange environmental purity cult. It is unacceptable to destroy habitat for millions of creatures and destroy those creatures in the process. It is unacceptable to kill trees – intelligent, conscious, sentient trees -- because you have a belief that they are unacceptable. Ponderosa pines are incredible trees. I wonder if this is an example of what living in urban Chicago or Washington DC and spending one's days inside office buildings does to someone's perspective and connection to the natural world. Read The Secret Life of Plants by Peter Tompkins and Christopher Bird. This book includes the studies by Clive Backster and should be required reading for everyone who works in the Forest Service. I hope the members of the Forest Service who haven't forgotten their hearts, who haven't lost their connection to the wild land, will "mutiny" against these insane plans and create a Forest Service that respects and loves the land and all the creatures, an agency that truly serves the forest and eliminates any human activity that jeopardizes these incredible lands, stopping the plunder. That would be an environmental "experiment" worth conducting. President Obama's administration goes from bad to worse in yet another example of shocking actions. So what other Forest Service lands are being "restored"?	
beninato, stefanie	One million acres seems well over the top to burn at one time. When there was 500,000 scres, the smell of smoke and the damage to air quality about 250 miles away was severe and made life unbearable for people even those without respiratory problems.	(93-1) Thank you for your comment. One million acres will not be burned at one time. Prescribed fires would be carefully initiated over a ten year time frame to "reestablish and restore the forest structure and pattern, forest health, and vegetation composition and diversity" (DEIS page iii).
beninato, stefanie	Can't some of these trees be logged and more productively used? And what about the immense amount of habitat being destroyed for all animals and birds in that area? Isnt the USFS suppose to take care of them?	(93-2) Thank you for your comment. There is a contract in place to harvest many of the trees and this would then be followed by prescribed fire. These activities will reduce the risk of high severity wildfires and the high volume of smoke emitted.
Berlioux,	The Eastern Arizona Counties Organization is a local government	(76-1) Thank you for your time and attention.

Pascal	organization created in 1993 by joint resolutions of the Boards of Supervisors and an Intergovernmental Agreement (IGA) between the Counties of Apache, Gila, Graham, Greenlee and Navajo to implement Presidential Executive Order 12372 (P.E.0. 12372) Intergovernmental Review of Federal Programs related to the clearinghouse process for review of Federal programs which affect the custom, cultures and economic well-being of the Counties. Eastern Arizona Counties Organization's Objectives as Expressed in its Plans and Policies Eastern Arizona Counties Organization Following Arizona Governor Executive Orders 90-21 and 83-6, the Policies and Procedures for Arizona's Review Process in Compliance with Presidential Executive Order 12372 were established, and Apache, Gila, Graham, Greenlee and Navajo Counties, regrouped into the Eastern Arizona Counties Organization, were designated as County Official Reviewers (COR) for the explicate review of direct federal projects by the U.S . Department of Agriculture and its respective agencies (U.S. Forest Service, Soil Conservation Service and Farmers Home Administration) and the U.S. Department of the Interior and its respective agencies (Bureau of Land Management,	
Berlioux, Pascal	National Park Service and U.S. Fish and Wildlife Service) affecting their areas. For 20 years since its creation, the Eastern Arizona Counties Organization has been representing the custom, culture, health, safety and economic well-being needs of its county members' residents and visitors with Federal and State agencies engaging in projects addressing a broad range of issues, with an emphasis on natural resources management. The five counties ("the Counties") of the Eastern Arizona Counties Organization ("ECO") are located in eastern Arizona along and beneath the Mogollon Rim that marks the southern edge of the Colorado Plateau. Five characteristics of the Counties are particularly relevant to the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative ("the 4FRI DEIS"): 1) Three of the four national forests regrouped into the Four Forest Restoration Initiative ("4FRI"): the Coconino National Forest, the Apache-Sitgreaves National Forests, and the Tonto National	(76-2) Thank you for the explanation of the creation of the Eastern Counties Organization (ECO).
Berlioux, Pascal	Forest, are located within four of the five ECO Counties: Navajo, Apache, Gila, and Greenlee. 2) The national forests of 4FRI, and	(76-3) Thank you for your comment.

other federal lands, occupy a very large proportion of the area of the ECO Counties: 9% of the land in Navajo County, 11% in Apache County, 55% in Gila and 77% in Greenlee County. 3) The landscape scale catastrophic wildfires in the national forests of the Southwest have a disproportionately large impact on the ecological, social and economic life of the ECO Counties, and on the health and safety of their residents and visitors. Four of the five largest wildfires in Arizona, including two of the largest wildfires in the nation, have occurred within the ECO Counties in the last decade: the Rodeo Chediski Fire of 2002 that consumed 460,000 acres; the Willow Fire of 2004 that burned 120,000 acre; the Cave Creek Complex Fire of 2005 that blazed through 244,000 acres and the Wallow Fire of 2011 that charred 538,000 acres. 4) Outdoor recreational activities conducted in the 4FRI national forests, such as, but not limited to, camping, motorized recreation, hunting, fishing, hiking, etc. by the local residents, and by visitors to the ECO Counties recreating from metro Arizona to the Rim Country, have a disproportionately large impact on the economic well-being and the economic development of the Counties. 5) The ECO Counties individually and collectively have made long term commitments to proactively participate in, assume leadership roles in and provide political support at the state and federal levels for forest restoration and wildfire prevention efforts at local and landscape scales, such as the White Mountain Stewardship Project and the Four Forest Restoration Initiative that the ECO Counties have been instrumental in creating and fostering. As such, the Eastern Arizona Counties Organization has a special interest in the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative. While the Eastern Arizona Counties Organization recognizes that it is only one of the many constituents of the U.S. Forest Service, and does not seek special consideration in the current comments and review process, we urge the Responsible Official to pay careful attention and give due consideration to the following comments in view of the uncommonly large effect that Forest Service land management decisions regularly have directly, or may occasionally have indirectly, on the ECO Counties' residents and visitors' enjoyment, custom, culture, health, safety and economic well-being. The ECO Counties individually and collectively have been

uniquely involved in: - Developing the concept of industry funded landscape scale restoration in Arizona; - Fostering the collaborative agreement that resulted in the 4FRI project; - Organizing the political support at the state and federal levels that made 4FRI possible; - Lobbying for the funding of landscape scale restoration in general, and 4FRI in particular, through the Collaborative Forest Landscape Restoration Program (CFLRP); and, - Resolving regulatory issues with the U.S. Department of Agriculture (USDA) and the U.S. Forest Service Washington Office (USFS WO), such as the cancellation ceiling issue, which hindered the implementation of industry funded landscape scale restoration. The Eastern Arizona Counties Organization, therefore, understands particularly well the issues at hand, the management processes engaged, the desired future conditions, and the difficulties and challenges involved. ECO appreciates fully the USFS 4FRI Team's intent to: i) ensure an adaptive management planning and implementation process that is inclusive, efficient, collaborative and science-based to promote healthy, resilient, diverse and productive national forests and grasslands; ii) support natural resources-based rural economic development and employment; and, iii) ensure the enjoyment of the 4FRI national forests by the current and future generations in a balanced approach of preservation, conservation and sustainable exploitation of the natural resources. In a spirit of continuous improvement, and based on the direct practitioner knowledge and experience gained through a uniquely long, diverse, often productive and sometimes difficult participation in the Forest Service planning and implementation processes, the Eastern Arizona Counties Organization would like to share its comments, its appreciation for the obvious work put into the 4FRI DEIS, and its concerns and suggestions as follows. Role of the Eastern Arizona Counties Organization in the 4FRI DEIS Process The Eastern Arizona Counties Organization recognizes that the 4FRI DEIS is a Forest Service-driven technical process, and generally supports the analysis mechanisms deployed by the USFS 4FRI Team to complete the assessment and the technical part of the planning. Although the Eastern Arizona Counties Organization and the ECO Counties retain and employ many talented individuals at the peak of the knowledge curve in their

respective fields, ECO does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as an organization representing the most direct and local expression of democratic government at the individual district or national forest level, ECO more generally defines its role at the policy-making level as it relates to public lands management processes. Therefore, although several of the following comments do apply to the technical aspects of the 4FRI planning processes, they purposefully do not address specific technical mechanisms thereof, and the Eastern Arizona Counties Organization is mostly satisfied that the USFS methodology is generally satisfactory, and that the studies that the USFS 4FRI Team in their expertise deem reliable, are adequate to support their technical conclusions (Lands Council v. McNair 537 F.3d 981 - 9th Cir. 2008). Therefore, the Eastern Arizona Counties Organization will focus its engagement in the 4FRI DEIS process, and its comments and suggestions, at the policy-making level and on whether the 4FRI Preferred Alternative contributes to the ECO Counties' residents' and visitor's enjoyment, custom, culture, health, safety and economic well-being. ECO will further focus its engagement on whether the 4FRI Preferred Alternative is consistent with the objectives of the ECO Counties as expressed in their plans and policies; on how the 4FRI project impacts related planning efforts by the ECO Counties; and, on the compatibility with and interrelated impacts of the 4FRI project and the ECO Counties' plans and policies.

Per the requirements contained in the 2012 Planning Rule, Title 36 - Parks, Forests, And Public Property, Part 219 - Planning, Subpart A - National Forest System Land Management Planning, Section 4 - Requirements for public participation, subsection (b) Coordination with other public planning efforts, the Eastern Arizona Counties Organization expects that: "The responsible official shall coordinate land management planning with the equivalent and related planning efforts of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments" (36 CFR 219.4 (b)(1)).

Berlioux, Pascal

Berlioux, The Eastern Arizona Counties Organization further expects that: "The

(76-4). Thank you for referencing the 2012 Planning Rule. This project has been reviewed against the direction in the current "Coconino National Forest Plan" (forest plan), as amended (USDA 1987), the "Land and Resource Management Plan for the Kaibab National Forest, as revised" (USDA 2014) and 36 CFR 219.17(b) (3). For clarification, this project has proposed three nonsignificant forest plan amendments for the Coconino NF. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule.

(76-5) Please see the response in comment #76-4 for information

Pascal	results of this review shall be displayed in the environmental impact statement (EIS) for the plan", and that "this review shall include consideration of: (i) The objectives of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments, as expressed in their plans and policies; (ii) The compatibility and interrelated impacts of these plans and policies; (iii) Opportunities for the plan to address the impacts identified or to contribute to joint objectives; and, (iv) Opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives" (36 CFR 219.4 (b)(2)).	concerning the relevant planning rule under which 4FRI was initiated.
Berlioux, Pascal	The Eastern Arizona Counties Organization posits that these statutory requirements are meant by Congress to imply more than a perfunctory review process resulting in a check mark in a 'coordination box' and imply a sincere and proactive resolution effort to reduce and resolve potential conflicts between aspects of 4FRI DEIS and objectives expressed in the ECO Counties' plans and policies; such as, but not limited to, those relevant to forested ecosystems restoration and catastrophic wildfire prevention objectives, watersheds restoration objectives, rangelands resources management objectives, or forest products resources management objectives.	(76-6) The comments from the Eastern Counties Organization (ECO), as well as other comments received during the official comment period, have been read, reviewed, and discussed by the 4FRI specialists. A summary of responses by topic will be part of the FEIS. The complete individual comment analysis will be posted on the project's website and filed in the project record. The Forests have collaborated with 4FRI stakeholders and interested publics including the Eastern Counties Organization. The DEIS (chapter 1) and FEIS (chapter 1) documents how collaboration was used during the planning process.
Berlioux, Pascal	The Eastern Arizona Counties Organization is committed to resolve or reduce potential conflicts between the 4FRI DEIS and the ECO Counties' plans and policies, and understands that such resolution must take place within the context of developing the 4FRI project's desired conditions or objectives. To this effect, it is the intent of the Eastern Arizona Counties Organization to avail itself of the opportunity contained in the 2012 Planning Rule that specifies that: "Where appropriate, the responsible official shall encourage States, counties, and other local governments to seek cooperating agency status in the NEPA process for development, amendment, or revision of a plan" (36 CFR 219.4 (a)(1)(iv)).	(76-7) In 2011 the Arizona Game and Fish Department (AGFD) was designated a cooperating agency. The AGFD provided wildlife data and wildlife analysis support for this project-level environmental analysis. (DEIS, Chapter 1).
Berlioux, Pascal	The ECO Counties' policy making decisions and management actions are guided by the ECO Counties plans. These plans guide the actions of the Boards of Supervisors and their county staff toward meeting the present and future enjoyment, custom, culture, health, safety and economic well-being needs of the Counties' residents or visitors.	(76-8) Thank you for your comments. All comments received on this project have been filed in the project record.

Berlioux, Pascal	The ECO Counties planning effort integrates the principles of: 1) Monitoring the effects and impacts of the implementation of the Counties policies, as well as the direct, indirect, individual and cumulative effects and impacts on the Counties and their residents and visitors of the policy decisions and management actions taken by state and federal agency partners; 2) Monitoring all demographic, social, economic, cultural and other variables, whether internal or external, which are relevant to the Counties' policy making decisions and management actions; and, 3) Dynamic and generally informal adaptive management. As such, the ECO Counties plans are evolving dynamic plans that constantly adapt, often informally, in response to the evolving ecological, economic, social and cultural environment, and that are formulated as much through the regular deliberations of the ECO Counties' Boards of Supervisors and the resulting Resolutions of the Boards, as they are in the formal planning documents. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the ECO Counties' objectives as expressed in their plans and policies (36 CFR 219.4 (b)), the ECO Counties plans defined as the accumulation of the formal ECO Counties planning documents and the ECO Counties public record of Boards of Supervisors deliberations and resolutions, are hereby entered into the 4FRI NEPA record. The Eastern Arizona Counties Organization appreciates and supports the extensive and thorough analysis performed by the USFS 4FRI Team for the 4FRI DEIS, and the discussion of the effects of the no action alternative and the three action alternatives on: Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; Transportation; Climate Change; Short-term Uses and Long-term Productivity; Unavoidable Adverse Effects; Irreversible and Irretrievable Commitments of Resources; and, Cumulative Effects. Multiple resources analyzed individually by the USFS 4FRI Team in the 4FRI DEIS are regrouped in a smaller number of overarching natural resources management policy objectives by the ECO Counties. In no particular order, the Counties' natural resources management	(76-9) Thank you for your explanation of how the resources were regrouped for ECO's analysis of the 4FRI DEIS.

	objectives relevant to the 4FRI DEIS comments include: 1) Rangelands Resources Management Objectives. Rangelands Resources Management Objectives address issues such as, but are not limited to, grazing availability, suitability, sustainability; ecological, economic and social carrying capacity; access; contribution to rural economic development; and, contribution to local Western custom and culture. 2) Forest Products Resources Management Objectives. Forest Products Management Resources Objectives address issues such as, but are not limited to, logging availability, suitability, sustainability, productivity, access; contribution to rural economic development; and, contribution to rural Western custom and culture. 3) Mineral and Energy Resources Management Objectives. Mineral and Energy Resources Management Objectives address issues such as, but are not limited to, the availability, suitability, sustainability, productivity, access, and contribution to rural economic development of (a) solid, liquid or gaseous mineral resources and (b) solar, wind, hydropower, geothermal and other natural renewable energy resources. 4) Motorized Travel and Recreation Management Objectives. Motorized Travel and Recreation Management Objectives address issues such as, but are not limited to, motorized access; motorized travel; motorized big game retrieval; motorized dispersed camping; motorized gathering of firewood; motorized access to dispersed fishing; motorized recreation opportunities; inventoried roadless areas; wilderness area designation; motorized access to grazing and logging opportunities; contribution of motorized access, recreation and travel to rural economic development; and, contribution to local Western custom and culture. 5) Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives. Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives address issues such as, but are not limited to, protection of Counties' residents and visitors; protection of collective and individual real properties; protection of transportation, energy and water collection and distribution infrastructures; ecological restoration of forested ecosystems; local scale restoration projects;	
Berlioux, Pascal	landscape scale restoration projects; social license required for the non-conflictual and non-litigious implementation of restoration	(76-10) General information has been provided. No response is required.

	efforts (such as the one requested in public statements by former USFS Southwestern Regional Forester Corbin Newman for the Four Forest Restoration Initiative); industry development required to implement and fund restoration efforts through economically viable utilization of the wood products; and, long term guarantees of wood supply necessary to attract private investments in a small diameter utilization infrastructure in northeastern Arizona. 6) Watershed Restoration Objectives. Watershed Restoration Objectives address issues such as, but are not limited to, ecological restoration of watersheds; protection and development of water collection and distribution infrastructures; monetization of watershed ecosystem services; downstream consumption contribution to upstream production investments and maintenance; and, interactions between watershed functions and multiple use functions. 7) Management Areas Designation Objectives. Management Areas Designation Objectives address issues such as, but are not limited to, the nomination, designation, and management of (a) inventoried roadless areas (which are technically not management areas per se but are an administrative designation) and (b) wilderness areas, primitive areas, research natural areas, wildlife quiet areas, and wild and scenic rivers; and, effects on socioeconomic resources and impacts on the other County objectives. The Eastern Arizona Counties Organization understands that some of these objectives are not directly relevant to the 4FRI DEIS inasmuch as, for example, the 4FRI alternatives are not contemplating the designation of management areas. However, most of these objectives are relevant to the 4FRI DEIS, inasmuch as the 4FRI alternatives either have direct effects on some Counties' objectives, such as Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives; Forest Products Resources Management Objectives; Watershed Restoration Objectives; and, Rangelands Resources Management Objectives; or, may have indirect effects on some Counties' objectives, such as Motorized Travel and Recreation Management Objectives. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the ECO Counties' objectives as expressed in their plans and policies (36 CFR 219.4 (b)), this	
Berlioux, Pascal		(76-11) For clarification, this analysis will not make grazing authorization decisions. This analysis will not be determining whether a road or route will be closed or part of a designated, transportation system. Those decisions occur in travel management-related analyses.
Berlioux, Pascal		(76-12) Thank you for the information.

	document: Eastern Arizona Counties Organization comments on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative is hereby incorporated into the ECO Counties' expressed plans and policies. The Eastern Arizona Counties Organization, therefore, expects that: i) the Responsible Official shall coordinate land management planning with the ECO Counties equivalent and related planning efforts(36 CFR 219.4 (b)(1)); ii) the consistency review and coordination action shall include consideration of the objectives of the ECO Counties as expressed in their plans and policies; and, iii) the Responsible Official shall consider opportunities to resolve or reduce conflicts, should	(76-13) Thank you for your comments. We have collaborated with the counties since the project was initiated. Since the counties have been part of the 4FRI stakeholder group, we have considered comments received from all publics, including the stakeholders. Please see the DEIS Chapter 1 for a summary of collaboration to date for the DEIS.
Berlioux, Pascal	some arise between the 4FRI DEIS and the ECO Counties' objectives (36 CFR 219.4 (b)(2)).	(76-14) Thank you for your comments. All comments received on the draft EIS from Federal, State and local agencies have been included in appendix I of the FEIS on pages 925 to 994. This satisfies Section 102 (c) of NEPA which states, "…comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public…" Although the project only directly affects Coconino County, comments from the Eastern Arizona Counties Organization has been included to reflect similar comments received from Apache, Gila, Graham, Greenlee and Navajo County. Per 40 CFR 1503.4, summarized responses to comments received on the draft EIS are included in this appendix. They have been organized by topic. All comments received on the draft EIS are available for public review at: https://cara.ecosystem-management.org/Public/Letter/172405?project=34857. All comments received were reviewed and responded to individually. The complete comment analysis and response document is located in the project record and is available on the project's website at: http://www.fs.usda.gov/main/4fri/planning.
Berlioux, Pascal	Per the requirements of 36 CFR 219.4 (b)(2), 40 CFR 1502.16(c) and 40 CFR 1506.2, the Eastern Arizona Counties Organization hereby requests that the results of the consistency review and coordination action between the 4FRI DEIS and the ECO Counties' objectives as expressed in their plans and policies shall be displayed in the Four Forest Restoration Initiative Environmental Impact Statement.	
Berlioux, Pascal	The Eastern Arizona Counties Organization appreciates and supports the fact that all three action alternatives include a clear priority for restoration treatments (PDEIS p. 62).	(76-15) Thank you for your comment. For clarification, the DEIS was not programmatic but site-specific. We assumed the (PDEIS) reference in this comment was to a programmatic document.
Berlioux, Pascal	The Eastern Arizona Counties Organization recognizes that the issues of forested ecosystem restoration and forest products management	(76-16) Thank you for this information.

	are fundamentally different, and are typically not discussed simultaneously in ecosystems non-departed or little departed from characteristic reference conditions. However, as the Forest Service and ECO both generally acknowledge: current conditions in the forested ecosystems and especially in the ponderosa pine and dry or wet mixed conifers-dominated forests of eastern Arizona are considerably departed from reference conditions, and at risk of continued uncharacteristic disturbances such as landscape scale catastrophic crown fires or insect infestations. Also, the Eastern Arizona Counties Organization acknowledges and appreciates the efforts made by the Forest Service, and particularly the Arizona national forests, to pioneer larger scale restoration efforts such as the White Mountains Stewardship Project. ECO has been and continues to be supportive of the White Mountain Stewardship Project and of its funding as a practical tool to initiate larger scale treatments and to incentivize the creation of a small diameter trees utilization infrastructure. Simultaneously, ECO acknowledges that the model of subsidized restoration treatments is not scalable at landscape level, as is required to restore the forests of Arizona, for lack of agency funding. As proposed in the Four Forest Restoration Initiative, an initiative that ECO was instrumental in creating, fostering and developing, landscape scale forest ecological restoration appears currently feasible only if it is funded by the economically viable utilization of the forested byproducts of restoration by private industry. While it is actually not a novation when it comes to forest products, as timber sales have been for centuries an established form of natural resources valuation and have funded the management of the resources, the concept of ecosystem services monetization is relatively new to the discussion of ecological restoration funding, and its full implications are still being tested. As a consequence, the Eastern Arizona Counties Organization suggests that both the Counties and the USFS 4FRI Team operate under a very specific constraint when it comes to forest restoration, inasmuch as the forest products industry in Arizona is the funding mechanism for landscape scale restoration in eastern Arizona, which imposes the concept of social acceptability or 'social license' for	
Berlioux, Pascal		(76-17) Thank you for your comment.

	appropriate scale industry to fund restoration logging activities at the landscape scale throughout the 4FRI project. The Eastern Arizona Counties Organization's Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives for the upcoming planning cycle include, among others: 1) Design and implement landscape-scale, consensus-based, industry-supported, accelerated community protection and forested ecosystems restoration in the 2.4 million acre ponderosa pine and mixed conifer-dominated forests of the Mogollon Rim. 2) Develop and sustain the social license required by Southwestern Regional Forester Corbin Newman as a prerequisite to the implementation of industry-supported landscape scale restoration. 3) Participate actively in the NEPA process, as a member of the public and as a Cooperating Agency, and provide robust comments to the Forest Service to ensure NEPA process integrity and survivability in the face of potential threats of litigation. Emphasize with the Forest Service a strategy of risk mitigation and focus on the end goal of accelerated restoration over partisan debates and exclusive focus on technical sciences to the detriment of social science and social license. 4) Create in eastern Arizona the wood supply conditions for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 5) Wherever and whenever possible, prioritize forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic	
Berlioux, Pascal	growth and employment in eastern Arizona with multiple industrial scale new investments.	(76-18) Thank you for your comment.
Berlioux, Pascal	The Eastern Arizona Counties Organization appreciates and supports the fact that all three action alternatives include a clear focus on mechanical restoration treatments yielding forest products (PDEIS p. 62).	(76-19) Thank you for your comment. As noted, the DEIS socioeconomic analysis (web-based DEIS, pp. 272-284) evaluated the direct and indirect economic output for each alternative. Again, for clarification, the DEIS was not programmatic but site-specific. We assumed the

		(PDEIS) reference in this comment was to a programmatic document.
Berlioux, Pascal	The inherent challenge faced by the Eastern Arizona Counties Organization and the USFS 4FRI Team is that the priorities typically considered when managing forest products, such as a sustained yield of harvest volumes on a regulated non-declining even-flow basis for the long term, uneven age structures, long term sustained yield capacity (LTSYC), non-declining allowable sale quantity (ASQ), etc., are augmented and complicated, and to a large extent superseded, by the overwhelming priority to complete landscape scale restoration as rapidly as possible for fear of massively disruptive landscape scale catastrophic crown fires and/or landscape scale insect or disease infestations.	(76-20) Thank you for your comment.
Berlioux, Pascal	Owing to the fact that for the foreseeable future green forest products will likely be byproducts of restoration treatments, and green forest products will likely continue to be at risk of destruction by catastrophic fires if landscape scale restoration is not expeditiously implemented, ECO suggests that forest products management actions for the upcoming planning cycle must be dictated not only by traditional silviculture science and best practices, but primarily by the absolute priority of implementing landscape scale restoration as expeditiously as possible using mechanical treatments that produce the forest products necessary to not only sustain the existing forest industry in the White Mountains, but also to allow robust natural resources-based rural economic development through the creation of an entirely new infrastructure of small diameter trees utilization at industrial scale.	(76-21) Thank you for your suggestion.
Berlioux, Pascal	The Eastern Arizona Counties Organization's Forest Products Resources Objectives for the upcoming planning cycle include, among others: 1) Create in eastern Arizona the wood supply conditions necessary for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 2) Sustain in the White Mountains the wood supply conditions necessary for the continued development and	(76-22) Thank you for the information.

	growth of the existing local industry, with expanded economically viable small diameter trees and residual biomass utilization facilities capable of funding the initial ecological restoration thinning of at least 15,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 3) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for sustained yield of harvest volumes on a regulated, non-declining even-flow basis for the long term, to the overriding priority of implementing as expeditiously as possible landscape scale restoration based primarily on mechanical treatments producing forest products. 4) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for uneven age management to the overriding necessity of sustaining the social license required to implement landscape scale restoration expeditiously and in a non-conflictual and non-litigious manner, as relates to the protection of old growth and the retention of large trees (upcoming old growth) where vegetative structural stages (VSS) 5 and 6 are deficient at stand or forest scale.	
Berlioux, Pascal	The Eastern Arizona Counties Organization appreciates and supports the analysis performed by the USFS 4FRI Team using the Watershed Condition Framework (WCF) to identify 6th level Hydrologic Unit Code (HUC) Class 1 (Functioning), Class 2 (Functioning-At-Risk) and Class 3 (Impaired) watersheds in the 4FRI project area, and to analyze the direct and indirect effects of the 4FRI project on water quality and water yield.	(76-23) Thank you for your comment.
Berlioux, Pascal	Uncharacteristic landscape scale forest crown fires in eastern Arizona have a demonstrated negative impact on the conservation and operation of the watersheds in which they occur. In addition to the damages caused to communities and ecosystems by the fires themselves, the most common negative effects on watersheds documented after the Rodeo-Chediski Fire, the Wallow Fire, in some areas, and the Schultz Fire, among others, are: uncharacteristic runoffs, catastrophic flooding, accelerated and aggravated soil erosion, streams and reservoirs sedimentation, and long term severe	(76-24) Thank you for your comment concerning the effects of high-severity fire on watershed functions.

	disturbance of the watershed functions.	
Berlioux, Pascal	The Rim Country constitutes a large portion of the watersheds that contribute significantly to the water supply of the metro Arizona and greater Phoenix area. The threat of additional uncharacteristic landscape scale forest crown fires in eastern Arizona, especially on the south slopes of the Mogollon Rim, raises serious concerns about the conservation and operation of the eastern Arizona watersheds. Additionally, the specific risk to the East Clear Creek watershed poses an existential threat to the Town of Payson's water supply. With the growing realization that uncharacteristic landscape scale forest crown fires affect the conservation and operation of the watersheds in which they occur, efforts to protect watersheds have recently been initiated in the Southwest. Several of these efforts focus on the monetization of the ecosystem services provided by the watersheds, and on an attempt to enroll the financial contribution of the downstream beneficiaries of the services (water consumers in this case) to the financial costs of protecting the upstream provider areas and the utility corridors delivering the services (forests, watersheds and water collection and distribution infrastructures at risk of catastrophic fires in this case). Such efforts were pioneered by the Denver Forest to Faucet project in Colorado, or the Santa Fe Municipal Watershed Protection project in New Mexico, among others. In Arizona, with the active contribution of the Eastern Arizona Counties Organization, an effort to create the Arizona Watersheds Investment Fund (AWIF) is underway, and in Flagstaff, Ballot Question #405 received electors' approval in November 2012 for the issuance of a $10 million municipal bond to finance the restoration treatments of high threat areas in the Rio de Flag and Lake Mary watersheds to provide greater protection to the community from the impacts of fires and floods.	(76-25) Thank you for your comment.
Berlioux, Pascal	Therefore, the restoration of forested ecosystems, ponderosa pine and mixed conifer-dominated, in the watersheds of the Mogollon Rim in general, and specifically in the East Clear Creek watershed, is an objective priority, among other areas in eastern Arizona also in need of restoration treatments, for the Eastern Arizona Counties Organization, after the direct protection of communities and infrastructures.	(76-26) Thank you for your comment. The East Clear Creek watershed is not within the planning boundary of the DEIS.

Berlioux, Pascal	The Eastern Arizona Counties Organization's Watershed Restoration Objectives for the upcoming planning cycle include, among others: 1) Prioritize restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures, on the slopes of the Mogollon Rim in general, and specifically in the East Clear Creek, Verde River, Little Colorado River, Upper Gila River, and Upper Salt River watersheds. 2) Develop the Arizona Watersheds Investment Fund (AWIF), and/or similar initiatives in order to fund restoration treatments that cannot be funded by the wood industry utilization of the forest byproducts of restoration in areas where the merchantable material yield is insufficient for mechanical treatments to be economically viable, or access by mechanical harvesting equipment is restricted, such as in steep slopes, high erosion areas, riparian areas, etc. 3) Develop in parallel and in a complementary manner all models of watersheds restoration funding such as industry funding, ecosystem services funding, municipal bonds funding, etc.	(76-27) Thank you for this information.
Berlioux, Pascal	The Eastern Arizona Counties Organization appreciates the addition of grassland restoration treatments to forestland treatments in Alternative C, the Preferred Alternative. ECO believes that this addition is significant not only because it implies the restoration of approximately 50,000 acres of rangelands, but because it aptly diversifies the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape restoration.	(76-28) Thank you for your comment.
Berlioux, Pascal	The Eastern Arizona Counties Organization's Rangelands Resources Objectives for the upcoming planning cycle include, among others: 1) Restore encroached grasslands, including the most departed semi-desert, Great Basin, and montane subalpine grasslands that have been invaded by trees (subalpine grasslands) and shrubs (semi desert and Great Basin grasslands) by removing trees and shrubs where economically feasible, promoting a mixture of native perennial grass species, implementing the periodic prescriptive use of mixed classes of livestock matching animal feeding habits with specific plant material, and reintroducing a regime of cool surface fires in order to reduce trees and shrubs colonization and erosion hazards, and to increase livestock forage production. 2) Adopt management	(76-29) Thank you for your comment. The DEIS in all action alternatives proposes restoration of grasslands (DEIS, Chapter 2).

	practices that discourage the establishment of nonnative species and eradicate invasive weed species that have little to no forage value, recognizing the fact that the ecological or economic consequences of different exotic species are not all the same, and that the persistence of some nonnative species that are not necessarily undesirable or controllable, such as Kentucky bluegrass or Bermuda grass, may be beneficial from a socioeconomic perspective and a balanced management for multiple resource objectives. 3) Allocate grass reserves on an allotment-by-allotment basis through proper range management, rather than on a district-by-district basis, which requires additional financial considerations for improvement maintenance. 4) Shift the grassland management process from the concept of balancing livestock grazing with available forage - which only addresses stocking rate - toward the concept of managing the intensity, frequency, seasonality, duration and classes of livestock grazing to accomplish the rangelands resources management objectives. 5) Emphasize adaptive management of the rangelands using a three step rangelands resources management monitoring approach of quantitative monitoring using standard measurements such as stocking rate, ground cover, etc.; qualitative monitoring using measurements such as species composition, age, nutritional value, etc.; and, effectiveness monitoring using outcome measurements such as range health, soil water holding capacity, soil organic content, livestock weight gain, wildlife indicator species, etc., in order to measure whether the management actions produce the site specific and cumulative direct and indirect effects desired. 6) Integrate the scientific research and implement the science-based recommendations developed by rangelands resources management experts and scientists. 7) Preserve the contributions of the rangelands resources to the economic development and the custom and culture of the rural Arizona counties.	
Berlioux, Pascal	1. The quality and thoroughness of the work exhibited by the USFS 4FRI Team in the 4FRI DEIS is outstanding. The Eastern Arizona Counties Organization is fully conscious of the fact that an enormous commitment was made and delivered upon by the USFS 4FRI Team, and that a legitimate pride of ownership must rest with the authors of the DEIS, as well as the Specialists' reports and other documents	(76-30) Thank you for your review and comments. Thank you for recognizing the tremendous collaborative effort that gone into the analysis, writing, and review creating the 4FRI DEIS. We appreciate your contribution to the further refinement of the DEIS by voicing your concerns and suggestions by way of your comments. Your concerns and suggestions have been noted in the specific responses to the

not published with the 4FRI DEIS but nonetheless part of the 4FRI project record. ECO urges the USFS 4FRI Team to consider the ECO comments NOT as a critic of their work, but as a goodwill effort toward continuous improvement of the 4FRI EIS, and as a proactive effort by ECO to disclose its objectives, plans and policies, and the rationales that support them, to facilitate the statutorily required consistency review, coordination action and conflict reduction regarding potential discrepancies between the 4FRI DEIS and the ECO Counties' objectives as expressed in their plans and policies and as discussed in this document. 2. Strategically, the Eastern Arizona Counties Organization overwhelmingly supports the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the following suggestions. Therefore, the following concerns and suggestions are not aimed at questioning the need to implement 4FRI but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process, which could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project as intended by ECO and the ECO Counties. 3. The Eastern Arizona Counties Organization readily acknowledges that several of the following comments and suggestions have already been addressed and agreed upon by the USFS 4FRI Team in the course of the work conducted by the DEIS Review Workgroup of the 4FRI Stakeholders Group with the USFS 4FRI Team. Also, considering the participation of ECO in both the 4FRI Stakeholders Group and the DEIS Review Workgroup, there is a high probability that there will be some level of repetition and redundancy between the ECO comments and the 4FRI Stakeholders Group comments, as well as comments from other stakeholders. Nonetheless, the NEPA process calls for comments on the DEIS as published, and for the formulation of ECO's concerns and suggestions, regardless of whether these are echoed in other comments or not. 4. As previously noted, although the Eastern Arizona Counties Organization and the ECO Counties retain and employ many talented individuals at the peak of the knowledge curve in their respective fields, ECO does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as a body comments which follow.

representing the most direct and local expression of democratic government at the individual district or national forest level, the Eastern Arizona Counties Organization more generally defines its role at the policy-making level as it relates to public lands management processes. ECO, therefore, believes that it is appropriate to comment at the programmatic level, from a Forest Service perspective, and at the objectives level, from a Counties' policy perspective.

For clarification, the Eastern Arizona Counties Organization wants to emphasize that although it generally supports the use of Best Available Scientific Information (BASI) for management decision, it does not support the exclusive use of technical sciences to formulate policies or to make strategic decisions that have an important impact on people. ECO believes that these decisions must integrate social sciences in the decision making process. For example, ECO believes that while there is no overwhelming supporting science on either side of the long debated issue of a universal diameter cap for restoration treatments (whether it be 9", 12", 16" or 18"), analyzing the issue of a diameter cap from just a technical science perspective is at best incomplete, because the issue of large trees retention is not only a technical issue, but also a social issue that cannot be adequately addressed by an exclusively scientific approach. Therefore, the Eastern Arizona Counties Organization comments will purposefully not emphasize technical issues of silviculture, such as uneven aged composition, regeneration openings, etc., but will be focused on what the Counties believe to be the crux of the successful and timely implementation of the overriding priority of landscape scale scientifically and socially acceptable – if admittedly imperfect – ecological restoration and catastrophic wildfire prevention. Namely: • Social acceptability of proposed treatments; • Speed of completion of landscape scale restoration; and, • Prioritization of treatments.

Berlioux, Pascal

Thank you for your comment. We used the best available science when developing the purpose and need and analyzing the effects of each alternative. What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, scientific uncertainty, and risk. See 40 CFR, 1502.9 (b), 1502.22, 1502.24 (USDA FS 2007). In the DEIS, an alternative was considered but eliminated from detailed study that would have limited mechanical treatments to 8-inch d.b.h. (DEIS, p48-51). This alternative was based on the assertion that crown fire can be effectively addressed with mechanical treatments that do not cut trees larger than 8 inches d.b.h. Small diameter mechanical tree cutting would be used to establish tree groups, nonforested openings (interspaces), and move toward a balance of tree age and size classes. Prescribed fire would be used to reduce litter and other surface fuels, stimulate herbaceous understory vegetation, prepare sites for natural ponderosa pine regeneration, and maintain interspaces. This alternative would partially address Issue 2, conservation of large trees, since mechanical treatments would be curtailed at 8-inch d.b.h. It would not achieve restoration desired conditions. It would resolve Issue 3, post-treatment canopy cover and landscape openness, since only small-diameter trees would be removed. However, approximately 73 percent of the 507,839 acres of ponderosa pine within the project area would not move toward forest structure and pattern desired conditions. Of all the even-aged stands, 47 percent (VSS 4), 8 percent (VSS 5), and 1 percent (VSS 6) would remain even-aged. There would be zero percent movement toward

desired conditions in uneven-aged VSS 4 through VSS 6. For these reasons, this alternative was considered but eliminated from detailed study. The DEIS documents an alternative considered but eliminated from detailed study that would incorporate the 4FRI stakeholder group-created Large Tree Retention Strategy (LTRS, or also referred to as the Old Growth Protection and Large Tree Retention Strategy) as written (DEIS, p 56-58 and p 60-61). A modified version of the original strategy, the Large Tree Implementation Plan, or LTIP, was included in alternatives C and E (DEIS, Appendix D, Section D p 646-654). Table 15 (DEIS p 60-61) in the DEIS displays a few excerpts from the original LTRS, the location of the excerpts in the LTRS, a crosswalk to the modified LTIP, and rationale why the original language was not accepted as written. For these reasons it was considered but eliminated from detailed study. The DEIS further documents an alternative considered but eliminated from detailed study that would limit mechanical treatments to 16" to preserve large trees (DEIS, p 58-59). This alternative was eliminated from detailed study because when managed to a 16-inch d.b.h. cut limit, the plurality of stands would trend toward a large diameter, single story, closed canopy condition that does not meet the projects desired conditions that are outlined in the DEIS at pages 8-29. The Forest Service agrees speed of completion and prioritization of treatments are very important, however, these two components are outside of the NEPA process.

Berlioux, Pascal	Alternative A, the no action alternative, does not offer the option of continuing an existing management approach to landscape scale forested ecosystems restoration in eastern Arizona inasmuch as there is currently no such approach. Alternative A would nonetheless result in the mechanical treatment of approximately 87,000 acres, and in the prescribed fire treatment of approximately 143,000 acres over the next five years (DEIS p. 62). However, the scale and pace of these management actions are incompatible with the urgent need to implement landscape scale restoration as identified in the purpose and needs for the 4FRI NEPA process. Therefore, the Eastern Arizona Counties Organization wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative A.	(76-32) Thank you for your comment.
Berlioux, Pascal	The Eastern Arizona Counties Organization understands the NEPA requirement for the 4FRI DEIS to analyze a no action alternative, and	(76-33) Thank you for your comment.

Berlioux, Pascal	ECO acknowledges and appreciates the existence of constituencies favoring no action. However, the Eastern Arizona Counties Organization cannot support an alternative that would result in the continuation of an unmitigated high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, the Eastern Arizona Counties Organization is concerned that Alternative A is in direct conflict with the Counties' objectives as expressed in their plans and policies. Suggested action The Eastern Arizona Counties Organization regrets to suggest that there is no possible corrective action to mitigate the incompatibility of Alternative A with the Counties' objectives as expressed in their plans and policies, or to resolve or reduce the conflict between Alternative A and the Counties' objectives as expressed in their plans and policies. Alternative A is so departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from the Eastern Arizona Counties Organization and the ECO Counties' natural resources management objectives, that it does not warrant any further discussion from the Counties' perspective Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) both generally meet the purpose and needs of landscape scale restoration in eastern Arizona, as analyzed by the USFS 4FRI Team, and the ECO Counties. For all practical purposes, Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) share many similarities: 1. The acreages treated, both mechanically and by fire-as-a-first-entry (approximately 388,000 acres treated mechanically and 588,000 treated with fire in Alternative B; and, approximately 434,000 acres treated mechanically and 593,000 treated with fire in Alternative C) are very similar; and, 2. The differences in acreage treated mostly result from the addition of grassland treatments to forestland treatments in Alternative C. Nonetheless, there are some differences between Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative): 1. The addition of grassland treatments to forestland treatments in the Preferred Alternative is significant inasmuch as it diversifies aptly the concept of landscape scale	(76-34) Thank you for your comment. We agree that alternative A (no action) would not meet the purpose and need for landscape-scale restoration as described in the purpose and need (DEIS, pp. 8-29). (76-35) Thank you for your comments. See the DEIS page 58 to 61 for more information regarding why the original large tree implementation strategy was modified. A modified large tree implementation plan was included in the DEIS for Alternative C in appendix D (DEIS p 646-654).

	restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape' restoration; 2. The increase in mechanical treatments upper limit from 16" to 18" diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) in the Preferred Alternative, while relatively minor from a treatments perspective, is likely to have an impact on the social acceptability of the proposed treatments; 3. The integration of some reworded components of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the Preferred Alternative is likely to have an impact on the social acceptability of the Preferred Alternative; and, 4. The integration of research projects in the Preferred Alternative is a welcome addition. The Eastern Arizona Counties Organization clearly views the addition of grassland treatments to forestland treatments in Alternative C as a positive step toward meeting the ECO Counties' Rangelands Resources Management Objectives, and generally supports the integration of research projects into restoration implementation projects, wherever and whenever feasible. ECO further supports the integration of stakeholders-developed strategies and foundational documents such as the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the 4FRI DEIS.	
Berlioux, Pascal	Conversely, the Eastern Arizona Counties Organization is concerned that the adaptation of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) into the USFS 4FRI Team Old Trees Implementation Plan (OTIP) and Large Trees Implementation Plan (LTIP) may have an impact on the social acceptability of the Preferred Alternative, as further discussed in the later section Old Growth And Large Trees. Therefore, the Eastern Arizona Counties Organization generally supports the concepts presented in Alternative C, the Preferred Alternative, provided that it is further refined per the suggestions offered in the ECO comments, as well as comments from other stakeholders critical to the viability of the 4FRI social license. However, the Eastern Arizona Counties Organization is concerned that some decisions made by the USFS 4FRI Team may compromise the social license developed for the implementation of the 4FRI project. Consequently, the Eastern	(76-36) Thank you for your comments. Based on multiple stakeholders comments to the DEIS and diligent work to clarify these comments, the Forest Service has provided clarity to the FEIS concerning retention of large young trees. Chapter 1 of the FEIS displays the tie of large trees to the Collaborative Forest Landscape Restoration Act and adds a Forest Health-Large tree section within the purpose and need. The FEIS also adds clarity to retention of large young trees in northern goshawk habitat outside of the wildland urban interface on about 38,260 acres where there are a preponderance of large young trees within the implementation plan for alternative C that are identified to manage at the higher end of the natural range of variability, larger group sizes and managed for a canopy cover at the stand level that will not only provide for large trees but for heterogeneity as well. Additionally, the FEIS displays an additional3.303 acres that were proposed for savanna treatments in alternative C will be managed more conservatively (less

Berlioux, Pascal	Arizona Counties Organization is concerned that the possible social license risk for the 4FRI DEIS potentially caused by some decisions made by the USFS 4FRI Team that may compromise the social license developed for the implementation of the 4FRI project, present a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments. The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team and the Responsible Officials exercise careful judgment in their decisions, in relation to: i) the true material importance of the issues, as opposed to their symbolic or emotional importance; and, ii) the potential effect of litigation on the implementation of the 4FRI project. ECO suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' recommendations, and the major benefits attached to sustaining the 4FRI social license.	intense treatment that were identified for these acres in alternative E in the FEIS) to retain more large trees on these acres. (76-37) Thank you for your suggestion. The Forest Supervisor's will be reviewing all responses to the issues. Also, please see the response to comment 76-36.
Berlioux, Pascal	Alternative D is identical to Alternative B (the Proposed Action) as regards mechanical treatments. It is also identical to Alternative C (the Preferred Alternative) as regards mechanical treatments, except for the minor difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs). The critical difference between Alternative D and Alternatives B and C is the use of fire as a treatment. In alternative D fire would be used on only approximately 179,000 acres, compared to 588,000 acres in Alternative B and 593,000 acres in Alternative C. The Eastern Arizona Counties Organization is concerned that the drastic reduction in the use of fire as a thinning treatment in Alternative D could prevent the timely completion of landscape scale restoration on the Mogollon Rim within the next 20 years as intended with the 4FRI project. ECO favors, wherever and whenever possible, prioritizing forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona, with multiple industrial scale new investments. However, ECO also recognizes that industry funded mechanical	(76-38) Thank you for your comment. Please note alternative D was developed to respond to concerns people had with prescribed fire emissions. That is why the alternative would reduce the use of prescribed fire by about 69 percent when compared to alternatives B and C. Although the alternatives may appear to be the same (with the exception of the acres of prescribed fire), the effects in terms of creating a resilient forest is very different. In the FEIS, we have clarified the key ecological differences between the alternatives, see table 33 of the FEIS and chapter 3, environmental consequences.

treatments are not appropriate in many sensitive areas such as steep slopes, fragile soils, riparian areas, etc., or in areas where the merchantable yield of restoration treatments would be economically unviable. Further, the Eastern Arizona Counties Organization acknowledges that agency funded mechanical treatments or hand thinning are disproportionately expensive as compared to fire thinning, and ECO appreciates that, as discussed in a different context but still related to the implementation of 4FRI treatments in the Apache-Sitgreaves National Forests Land Management Plan PDEIS: "the alternatives were realistically designed to reflect anticipated budgets and workforce capabilities," and "none of the alternatives would actually treat enough acres fast enough to fully reach desired conditions within the first 5 decades" (A/S PDEIS p. 440). The use of fire as a treatment tool is, therefore, not a luxury from a timeline, economic or practicality perspective, but is instead a necessity. Additionally, ECO believes that the ecological role of fire is absolutely critical to the long term ecological sustainability of the forested ecosystems of the Southwest, and that a management alternative that would reduce unduly the use of fire could compromise, in the long term, the implementation of post-treatment maintenance burns. In consequence, the Eastern Arizona Counties Organization wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative D. The Eastern Arizona Counties Organization understands the NEPA requirement for the 4FRI DEIS to analyze significantly different alternatives, and ECO acknowledges and appreciates the existence of constituencies concerned with prescribed fire emissions, and who favor alternatives such as Alternative D. However, the Eastern Arizona Counties Organization cannot support an alternative that could reduce the scope and significantly slow the pace of landscape scale restoration in eastern Arizona, which could result in the unnecessary prolongation of a high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, the Eastern Arizona Counties Organization is concerned that Alternative D is not compatible with the Counties' objectives as expressed in their plans and policies. Suggested action The Eastern Arizona

Counties Organization is concerned that there may not be a corrective action to mitigate the incompatibility of Alternative D with the Counties' objectives as expressed in their plans and policies. Alternative D is too departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from the Eastern Arizona Counties Organization and the ECO Counties' natural resources management objectives, to warrant further discussion from the Counties perspective.

Notwithstanding any of the above, the Eastern Arizona Counties Organization is concerned about the three action alternatives and the range of alternatives that they represent. Specifically, even though the Eastern Arizona Counties Organization recognizes differences between the three action alternatives as discussed in the previous sections Alternatives B and C and Alternative D, ECO is concerned that the mechanical treatments in each of the three action alternatives are similar enough in scale, scope and intensity that the DEIS may not offer an actual range of alternatives when discussing mechanical thinning. Arguably, the difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) is minor, and the addition of grassland treatments in Alternative C or the reduction of fire treatments in Alternative D do not affect forestland mechanical treatments per se. The Eastern Arizona Counties Organization itself is generally satisfied with the mechanical treatments proposed in alternatives B, C and D, provided these treatments are refined to integrate the suggestions of the ECO Counties and other stakeholders integral to the 4FRI social license. However, ECO is concerned that the 4FRI DEIS could be perceived as a DEIS based on a single alternative of mechanical treatments, with non-significant variations between the three action alternatives. Therefore, the Eastern Arizona Counties Organization is concerned that the 4FRI DEIS may fail to comply with the Council on Environmental Quality (CEQ) requirements to provide and analyze a range of alternatives (Sec. 1505.1 (e) and Sec. 1502.14 (a)) and that the absence of a broader range of analyzed mechanical treatments alternatives may present a process risk for the 4FRI DEIS. Consequently, the Eastern

Berlioux, Pascal

(76-39) Thank you for your comment. The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). "The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed "(36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14).The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS, as well as an additional considered but eliminated alternative. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives

	Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a broader range of analyzed mechanical treatments alternatives, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.	considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study.
Berlioux, Pascal	The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team request a third party legal review of the NEPA and CEQ requirements in, and of the 4FRI DEIS compliance with, Sec. 1505.1 (e) and Sec. 1502.14 (a).	(76-40) Thank you for your recommendation.
Berlioux, Pascal	The degree of canopy openness in the immediate post-treatment conditions and in the long term desired future conditions has for several years been an issue of debate among the 4FRI stakeholders and the 4FRI collaborative group, including the USFS 4FRI Team, and is likely to remain one. This issue is linked to the discussion of whether vegetative structural stages (VSS) and canopy closure should be measured at group level, as proposed in the 4FRI DEIS, or at stand level, as currently implemented under the Coconino National Forest Plan. Amending the Forest Plan will resolve the technical compliance issue, but it does not address the more fundamental question of whether guidelines originally designed to be implemented at stand or even forest scale (outside Mexican Spotted Owl protected areas) are directly transferable, or not, to groups within stands. Additionally, the creation of interspaces between groups, in addition to the creation of regeneration openings within groups, will undoubtedly result in a significantly lower canopy density than was deemed desirable in the Management Recommendations for the Northern Goshawk in the Southwestern United States. Clearly, the USFS 4FRI Team has endeavored to be responsive to this concern, as evidenced in the 4FRI DEIS Appendix G Bridge Habitat, Appendix D Alternative B through D Implementation Plan, and in the silviculture Specialist Report. However, the Eastern Arizona Counties Organization is concerned that the issues raised by partner agencies such as the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department, and by a broad range of stakeholders, have not yet been fully resolved. Questions remain about how and at what scale	(76-41) Thank you for your comments. The issue of openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, "Interspace would occupy approximately 25 to 40 percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet". Table 118 on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. The implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is

post-treatment canopy openness will be measured, and how group size, basal area (BA), stand density index (SDI), interspaces, regeneration openings, trees per acre (TPA), and quadratic mean diameter (QMD) interrelate to result in a trajectory toward desired future conditions. As previously noted, the Eastern Arizona Counties Organization does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Further, ECO readily admits that it lacks the technical competence to contribute meaningfully to the resolution of arcane technical issues such as density management and the relationship between treatment intensity, tree group density, and overall average density, as relates to the implementation of post-treatment openness. Suffice it to say that the very fact that the discussion continues unabated is concern enough to ECO that a zone of agreement has not been reached, or that the issues have not been understood clearly and broadly enough for the emergence of a general zone of agreement.

designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In

		response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Berlioux, Pascal	The Eastern Arizona Counties Organization understands that differences of opinions will exist regarding desired canopy openness. What concerns ECO is the confusion that exists about questions that should be answered with data, such as: - Does science support the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups (within stands)? - How does canopy openness measured at group level compare with the reference condition? - How and at what scale will post-treatment openness be measured in 4FRI? - Does a range of basal area of 50 to 70 in the largest treatment categories provide enough flexibility for a full range of treatments, considering other metrics such as trees per acre (TPA), stand density index (SDI), percentage of interspace, and percentage of openings? - How will habitat be provided to closed canopy and high closed canopy dependent species in the post treatment interim between the thinning of their current habitats and the natural development of high and dense canopy cover in the future old growth?	Please see the response to #76-41. Regarding wildlife habitat, we have included a summary of post-treatment openness to chapter 2 of the FEIS (summary of effects table). Post-treatment openness, with a summary of effects, been provided for Mexican spotted owl and goshawk. Also see appendix G of the FEIS. In addition, since the publication of the DEIS, a new publications that display the natural range of variability for southwestern frequent fire forest has become available (RMRS GTR-310 see citation below). The silviculture report for the FEIS contains a summary of how the proposed treatments meet the natural range of variability for southwestern ponderosa pine that your comment raises. Reynolds, Richard T.; Sánchez Meador, Andrew J.; Youtz, James A.; Nicolet, Tessa; Matonis, Megan S.; Jackson, Patrick L.; DeLorenzo, Donald G.; Graves, Andrew D. 2013. Restoring composition and structure in Southwestern frequent-fire forests: A science-based framework for improving ecosystem resiliency. Gen. Tech. Rep. RMRS GTR-310. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 76p.
Berlioux, Pascal	Therefore, the Eastern Arizona Counties Organization is concerned that the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, may be both a process risk and a social license risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk and social license risk for the 4FRI DEIS potentially caused by the direct transfer of canopy density	(76-43) Thank you for your comment. Please see the response to #76-41 and #76-42.

	guidelines, originally designed to be implemented at stand or even forest scale, to groups, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments. The Eastern Arizona Counties Organization respectfully suggests the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting the science or, if science is lacking, the reasoning backing their decisions to transfer the canopy density guidelines originally designed to be implemented at stand or even forest scale, to groups; 2. Answering specifically the stakeholders' questions regarding the assumptions made in Appendix G Bridge Habitat (for example: percentage of openness at stand level including interspaces and regeneration opening; percentage of existing old growth in old growth allocations; relative higher density of canopy in MSO and goshawk habitats post plan amendments; etc.); 3. Providing qualitative and quantitative 'visual' descriptions of post treatment objectives, including relative proportions and actual sizes of groups, stands, openings, etc., for each treatment type; and, 4. Explaining clearly how openness will be measured post treatments, how it will	
Berlioux, Pascal	be monitored, how the monitoring data will trigger adaptive management, and at what thresholds. As discussed above, and as analyzed in the 4FRI DEIS, forest plans amendments are technically required for 4FRI to be implemented under the current forest plans of the Coconino and Kaibab national forests. These amendments essentially address management actions (mechanical treatments up to 16" or 18" d.b.h., and low-intensity prescribed fire) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs); and (a) resolve the issues of desired percentage of interspace within uneven-aged stands; (b) add the interspace distance between tree groups; and, (c) add language clarifying where canopy cover is and is not measured to facilitate restoration in goshawk habitat (excluding nest areas). The amendments also remove the cultural resource standard that requires achieving a "no effect" determination, and allow for a "no adverse effect" determination. The amendments further remove language	(76-44) Please see our response to comment 76-41 and 76-42.
Berlioux, Pascal	referencing monitoring of Mexican Spotted Owl Protected Activity Centers (pre- and post-treatment, population, and habitat), and	(76-45) Thank you for your comments. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52(DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that

defer to the U.S. Fish and Wildlife Service the monitoring and design of the treatments in Mexican Spotted Owl protected habitats. The Eastern Arizona Counties Organization understands the technical necessity of amending the forest plans and has no specific issue with the concept. However, ECO is concerned about the decision of the USFS 4FRI Team to characterize the amendments as non-significant, and to defer 4FRI projects design and monitoring in Mexican Spotted Owl protected habitat to the U.S. Fish & Wildlife Service, without including the U.S. Fish & Wildlife Service monitoring plan and guidelines for projects design in the 4FRI DEIS. The Forest Service Manual provides guidance in Sec. 1926.52 Changes to the Land Management Plan That are Significant as follows: "2) Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period." In the USFS 4FRI Team's own analysis in Appendix B Forest Plan Amendments: "The canopy cover portion of the amendment would affect 139,308 acres (18 %) of all goshawk habitat on the Coconino NF and about 35 % of goshawk habitat within the project area" (DEIS p. 466); and: "The amendment would affect approximately 20 % of all suitable goshawk habitats on the forest and about 27 % of goshawk habitat within the project area" (DEIS p. 482). It is unclear to the Eastern Arizona Counties Organization if there is an official percentage threshold for significance in the Forest Service regulations, but it seems that the common understanding of the word 'significant' - "a noticeably or measurably large amount" (Merriam Webster) - would include 35 % of goshawk habitat within the project area in the Coconino National Forest, or 27 % of goshawk habitat within the project area in the Kaibab National Forest. Citing these two percentages as precisely the reason why "For this reason, location and size (were) determined to be non-significant" (DEIS p. 466 and p.482) seems questionable, unless guided by an agency guideline, in which case a reference would be useful. Additionally, it is unclear how the canopy cover portion of the amendments would affect only 35 % and 27 % of goshawk habitat respectively, although ECO speculates that it is related to higher vegetative structural classes (VSS). Further, the Eastern Arizona Counties Organization is generally comfortable that

describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in

habitat restoration and reduction of fire risk are key to improving Mexican Spotted Owl (MSO) habitat quality and, therefore, are aligned with both the current Coconino and Kaibab forest plans, as amended, and the U.S. Fish and Wildlife Service's (USFWS) revised MSO recovery plan (2012). However, ECO is concerned that deference of treatments design to another agency (USFWS) without integrating this agency's proposed treatments, or at least guidelines, in the 4FRI DEIS makes it impossible for the 4FRI DEIS Team to analyze the site specific and the cumulative effects of the treatments. Therefore, the Eastern Arizona Counties Organization is concerned that the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the inclusion of a USWFS monitoring plan or treatments guidelines, and without the possibility to analyze their effects in the 4FRI DEIS, may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the possibility to analyze their effects in 4FRI, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.

appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternatives displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C): Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific

		information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS).
Berlioux, Pascal	The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team request a third party legal review of the Forest Service Manual requirements in, and of the 4FRI DEIS compliance with, Sec. 1926.52 as relates to a determination of non-significance.	(76-46) Thank you for your recommendation.
Berlioux, Pascal	The Eastern Arizona Counties Organization further respectfully suggests that U.S. Fish and Wildlife Service monitoring plan and guidelines for the design of treatments in Mexican Spotted Owl protected habitats be incorporated into the 4FRI DEIS, and that their expected direct and indirect site specific effects be analyzed, presented, and integrated into the cumulative effects analysis.	(76-47) Thank you for your recommendation. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E, attachment 1 of the FEIS includes Mexican spotted owl monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane.
Berlioux,	The Eastern Arizona Counties Organization respectfully suggests that	(76-48) Thank you for your suggestion. However, the intent of the

Pascal	the USFS 4FRI Team include strict and restrictive guidance regarding the possible removal of old growth, including a maximum number of trees removed according to appropriate metrics such as possibly: per 10 acre block, per mile, per project, or similar.	project is to retain all pre-settlement trees unless there is a public health and safety issue. See response to comment 76-47.
Berlioux, Pascal	The adaptation of the stakeholders-developed single document Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) by the USFS 4FRI Team resulted in two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Large Trees Implementation Plan (LTIP) is discussed in the following section Large Trees. Clearly, the focus of the 4FRI stakeholders on old growth protection has been integrated by the USFS 4FRI Team in the 4FRI DEIS. Section C Old Trees Implementation Plan of Appendix D Alternative B through D Implementation Plan captures the essence of the stakeholders' old growth protection strategy: "Old trees would not be cut for forest health issues or to balance age or size class distributions" (DEIS p. 644). The Eastern Arizona Counties Organization also observes that, as required in order to comply with the forest plans, old growth allocation in the 4FRI DEIS meets the 20% minimum requirement for vegetative structural stage (VSS) 6 Old Forest; and Appendix D Section B Decision Matrix for establishing tree groups, interspace, and regeneration openings, preserves trees with old tree characteristics. However, the Eastern Arizona Counties Organization observes that, past the affirmative statements in the 4FRI DEIS, the actual field decisions are left open to individual judgment. While "human health and safety" (DEIS p. 644) should be a fairly objective criteria, "additional habitat degradation" may be more open to interpretation, as illustrated in Section C Old Trees Implementation Plan itself where the example of prevention of additional habitat degradation involves … road construction! Further, the Eastern Arizona Counties Organization also observes that the 4FRI DEIS states that "most sites (allocated to old growth) currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans" (p. 15). Considering that the purpose of allocating acres to old growth forest is to manage these acres for the fastest possible growth of existing trees toward VSS 6, there is a high likelihood that mature large trees in VSS 5 may be thinned in order to reduce	(76-49) Thank you for your comments. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range". The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the

competition for VSS 6 candidates. This decision also involves personal interpretation and individual judgment calls which may prove socially acceptable or disastrous based on the individual making the decision. Therefore, the Eastern Arizona Counties Organization is generally satisfied with the Old Trees Implementation Plan (OTIP) and old growth management objectives stated in the 4FRI DEIS, but remains concerned that its implementation may be a social license risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible social license risk for the 4FRI DEIS potentially caused by a misguided implementation of the Old Trees Implementation Plan (OTIP), may present a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.

Large trees are particularly precious inasmuch as they represent the 'future old growth' necessary to restore the forests of eastern Arizona to an ecologically sustainable condition, and to provide habitat to dense and high canopy dependent species. The old growth 'allocation' requirement of 20% in the forest plan, as discussed in the previous section Old Growth, is a 'paper' allocation and should not be confused with the 'actual' old growth that exists in the lower single digit percentage across the forests, numerically far below the required 20% - or even 10% - and temporally far removed from reaching the required 20%. The deficit of actual vegetative structural stage (VSS) 6 Old Forest is what makes vegetative structural stage (VSS) 4 and 5 Mid-age Forest and Mature Forest important. This reasoning guided the Eastern Arizona Counties Organization when it participated to the stakeholders development of the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) that the USFS 4FRI Team adapted into two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Old Trees Implementation Plan (LTIP) is discussed in the previous section Old Growth. The purpose of the stakeholders' large trees retention strategy is to emphasize the retention of large trees (VSS 4 and 5) in order to re-establish the old growth necessary

Berlioux, Pascal

landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

(76-50) The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the

for the ecological sustainability of eastern Arizona forests. However, the large trees retention strategy also includes a series of exception mechanisms that codify the socially acceptable removal of large trees (VSS 4 and 5) with a diameter superior to 16" at breast height (d.b.h.), when their removal is necessary to achieve the ecological restoration objective, to increase heterogeneity, and/or to conserve biodiversity. The stakeholders' document also includes provisions for collaborative adaptive management and collaborative participation to propose decision content, while complying with the statutory retention of the decision making authority by the Responsible Official. The Eastern Arizona Counties Organization is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) i) does not fully reflect the intent of the stakeholders; and, ii) does not take advantage of the products of the 4FRI collaboration. Specifically: 1. The Forest Service determined that: "The original LTRS did not provide the ability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings category" (DEIS p. 57). In so stating, the Forest Service apparently overlooks the fact that removal of individual large young trees is allowed under the exception mechanism, as required to meet the ecological restoration objective. The stakeholders' intent in constraining the removal of groups of large young trees is to allow the development of future old growth as required in the forest plans, including old growth groups. 2. The Forest Service further determined that: "this would result in a continued imbalance of size classes that would be contrary to the forest plan desired conditions" (DEIS p. 57). In so stating, the Forest Service fails to capitalize on the fact that the 4FRI DEIS already includes several forest plans amendments and that these amendments can address this issue as well. Further, the USFS 4FRI Team does not disclose at what scale the imbalance would occur. Imbalance at group level, or even possibly at stand level, becomes balance at larger scales as groups of VSS 5 future old growth balance large areas devoid of them. 3. The Forest Service also determined that: "The original LTRS would have required the Forest Service to consult with stakeholders should a new exception category be found

landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. See our previous response regarding the large tree retention strategy and alternatives considered but eliminated that addressed diameter limitations as a means to conserve large trees.

	during implementation (LTRS, page 25). To resolve the potential for Federal Advisory Committee Act (FACA) violations, this consultation requirement was removed" (DEIS p. 57). In so stating, the Forest Service misses an opportunity to take advantage of the MOU signed between the USFS and the stakeholders to address specifically such issues through collaboration incompliance with FACA. Therefore, the Eastern Arizona Counties Organization is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) is likely to be a significant social license risk for the 4FRI DEIS, and that the risk / benefits analysis of the social license risk vs. the restoration benefits may be unfavorable to 4FRI. Consequently, the Eastern Arizona Counties Organization is concerned that the social license risk for the 4FRI DEIS likely caused by the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP), presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments. The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2. Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during implementation; and, 3. Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale analysis not address the issue of continued imbalance of size classes.	
Berlioux, Pascal	The Eastern Arizona Counties Organization observes that there are only a mere 5 instances of the word "prioritization" in the 744 page 4FRI DEIS. ECO further observes that none of these instances apply to the discussion of the concept of treatments prioritization, for the obvious reason that there is no discussion of treatments	(76-51) See previous responses. (76-52) Recommendations that included sequencing were categorized as outside the scope of this analysis. The disclosure of sequencing within a NEPA document would be problematic because it would bind the Agency to a fixed schedule that may be unattainable due to weather, fires, markets, or other unforeseen circumstances. It would

prioritization in the 4FRI DEIS, including in Appendix D Alternative B through D Implementation Plan, or in the specialist reports or in the project record. The Eastern Arizona Counties Organization also observes that Appendix D Alternative B through D Implementation Plan contains no discussion of timing or sequencing of treatments and that the concept of 'Implementation Plan' seems interpreted in the 4FRI DEIS as 'guidelines to implement' rather than 'action plan to implement' or 'work plan to implement.' ECO certainly realizes that minute details of implementation are not a NEPA concern but a contracting management concern. However, ECO also posits that the implementation of a management action as far reaching in scope and temporal and geographical scale as 4FRI, requires a discussion of timing and sequencing, inasmuch as timing and sequencing of treatments are of a nature to potentially impact significantly the site specific effects of individual treatments and the collective cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects). Further, the concept of 'Strategic Placement' of the treatments, in relation to values to be protected, dominant winds, modeled fire behaviors, etc., is critical in the determination of what treatments are most appropriate, how many treatments are required, what treatment intensities are required, and what is the best distribution between treatment types (mechanical vs. fire). The 4FRI stakeholders worked extensively to produce the Landscape Restoration Strategy for the First Analysis Area (2010) that addressed in detail the concept of geographical and temporal prioritization. This work was further refined with the participation of the USFS 4FRI Team into a classification of High Resource Values (HRVs) and Medium Resource Values (MRVs). Some elements of this work were utilized by the USFS 4FRI Team in the 4FRI analysis process, but the discussion of strategic placement; geographical and temporal prioritization; and, their impact on: number, type, intensity, individual and cumulated effects of treatments, is missing. The Eastern Arizona Counties Organization is not inferring the need to re-analyze the location of the treatments. ECO is generally satisfied with the map of treatments location. Rather, ECO is suggesting the need

likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS does not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation is most appropriately addressed in implementation and operations. Recommendations that included strategic placement of treatments were categorized as being outside the scope of the analysis and not in alignment with the purpose and need for the project. Treating only strategic locations is a strategy used for hazardous fuels treatments when the primary objective is to modify fire behavior and to reduce high severity fire effects. In ponderosa pine, there is an overlap between hazardous fuel treatments and restoration treatments because restoring ponderosa pine forests generally results in reducing the severity of potential fire effects. Fuel treatments can include such strategies as thinning from below or leaving a minimum distance between tree crowns or boles. Neither of these would put a ponderosa pine forest on a trajectory towards health and resilience. The treatments displayed in the DEIS (alternative C, preferred alternative) and FEIS are designed to put the landscape on a trajectory towards the desired condition by treating the entire landscape, not just 'strategically' placed treatments. Additionally, on a landscape the size of the 4FRI, it would be a gamble to guess where a fire might start, and the variables would be too numerous to make such an assessment valid.

	to integrate in the NEPA analysis when and in what order the treatments already identified spatially will take place, as timing and sequencing have a direct impact on the number, type, intensity and effects of treatments. The Eastern Arizona Counties Organization is not inferring the need to re-analyze the location of the treatments. ECO is generally satisfied with the map of treatments location. However, because the timely implementation of the restoration treatments is critical to meeting the purpose and needs of the proposed action, ECO is concerned that the spatial and temporal sequencing of the treatments may have a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Consequently, the absence in the 4FRI DEIS of spatial and temporal strategic timing and sequencing of the treatments, and integration of the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI EIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a discussion of strategic placement, spatial and temporal prioritization, and their influence on the number, type, intensity, and individual and cumulated effects of treatments, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments. The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting a temporal prioritization of the treatments and a sequenced timeline of implementation for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; 2. Presenting a spatial prioritization of the treatments and the sequenced locations of the treatments, for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; and, 3. Presenting how the temporal and spatial prioritization affect the number of treatments, type of treatments, intensity of treatments, direct, indirect, site specific, and cumulated effects of the treatments.	
Berlioux, Pascal		(76-53) See previous responses. We recommend the counties continue to work with the forests and the monitoring and adaptive management group during implementation.
Berlioux,	Fire behavior modeling is a critical part of the 4FRI site specific and	(76-54) Page 15 to page 25 of the fire ecology report prepared for the

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cumulative analysis process, and the Eastern Arizona Counties Organization appreciates the fact that a major effort was made along the entire 4FRI analysis process, starting well before the DEIS, or even the Proposed Action, to model the cumulative effects of landscape scale restoration treatments on fire behavior. To ECO, post-treatments and long term future desired conditions fire behaviors represent much of the 'end game' in 4FRI, as the restoration of a natural regime of regular cool surface fires is fundamental to the long term ecological sustainability of the forests of eastern Arizona. Probably as a consequence of the fact that the 4FRI DEIS does not include a specific treatments implementation plan including timing, prioritization and sequencing of treatments in Appendix D Alternative B through D Implementation Plan (see section Prioritization here above), the fire behavior modeling in the 4FRI DEIS only provides a theoretical modeling based on the unrealistic premise that all treatments would happen simultaneously. This is unfortunate because the fire behavior modeling cannot include accurate canopy characteristics (base height, bulk density and cover) or surface fuel loading for any given large area at any given point in time as a result of some treatments being implemented; some treatments not being implemented yet, with fuel load further increasing and canopy characteristics further degrading; and, some treatments having been implemented, possibly as earlier as a decade earlier, with canopy and fuel loading characteristics at various stages of regrowth. Accordingly, the Eastern Arizona Counties Organization is concerned that post-treatment fire behavior as modeled may not represent reality, and that the analysis of the cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects) may be tainted. Therefore, the Eastern Arizona Counties Organization is concerned that the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, due to the lack of timing and sequencing of the treatments, may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for

DEIS outlines methodology and modeling used to support the fire analysis. For example, the fire report states, "Fire behavior for existing conditions was modeled for the project area using default Landfire Refresh 08 data. Results were reviewed by local fire experts (district, forest, National Park Service and non-federal firefighters and managers), and adjustments made to improve model accuracy. The process was repeated to further improve results. Fire behavior for post-treatment conditions was modeled using FlamMap and a combination of Landfire Refresh 2008 data and FVS-FFE data (LANDFIRE 2010a, LANDFIRE2010b). Post-treatment canopy characteristics and fuel loading were determined using the Fire and Fuels Extension (FFE) (Reinhardt and Crookston 2003) to the Forest Vegetation Simulator, FVS (Dixon 2002). In fire modeling, outputs (such as fire type and fireline intensity) are determined, in part, by the fuel models used. Post treatment fuel models need to take into account changes in total fuel loading and fuel structure. Landfire data must be manipulated to produce post-treatment conditions for fire modeling, so outputs from FFE were used to develop post-treatment fuel models. The modeled post-treatment fire behavior data are the result of combined stand data from the Forest Vegetation Simulator (FVS) and Landfire Refresh 2008 data. Post-treatment fire type was modeled by using outputs from FVS-FFE to adjust the percent of change to canopy characteristics and surface fuel loading and to inform the assignation of post-treatment fuel models. Details of the process for assigning post-treatment fuel models for modeling fire type is included in Appendix D. FVS outputs used were stand averages that were used to give a general idea of what stand conditions would look like, but could not address the spatial distribution of specific metrics on the same scale as the Landfire data. Landfire/FlamMap data are gridded (raster) data, with a resolution of 30 meters. FVS/FFE data is vector based, with smallest units being the size of individual stands. The 'hills and valleys' of the stand characteristics were smoothed out when the stand data were averaged, resulting in the fire behavior also being 'smoothed out' somewhat. A stand is 'typed' as a single vegetation type, though it may have a mix, for example, of pine forest and grassy openings. Habitat types (e.g. core areas, restricted habitat, etc.) were classified at the stand level to facilitate silvicultural analysis. Fire behavior was modeled at the 30

	the 4FRI DEIS potentially caused by the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.	meter scale. The resolution for modeled fire behavior is 30 meters". The cumulative effects analysis for all alternatives is located on pages 227 to 249. Pages 18-23 of the fire ecology report specifically discuss methodology for evaluating canopy characteristics and fuel loading. Pages 23 to 25 display data sources and models. Appendix D of the fire ecology report (pp. 283-321) is titled, "Descriptions of models and processes used in fire modeling". Appendix D not only includes information on how the model was used but also discusses limitations associated with specific models.
Berlioux, Pascal	The Eastern Arizona Counties Organization respectfully suggests that subsequent to the completion of an analysis presenting a temporal and spatial prioritization of the treatments, the USFS 4FRI Team provide a clear and compelling analysis of the effects of the treatments on fire behavior, presenting annual or bi-annual fire behavior modeling based on the outcome of the progressive implementation of 30,000 acres of restoration treatments annually over the 10 year life of the 4FRI project, and that the impact of this analysis be integrated in the analysis of the number, type and intensity of treatments required to meet the purpose and needs, and the direct, indirect, site specific, and cumulated effects of the treatments.	(76-55) Please see previous responses concerning prioritization and fire modeling. In summary, It is not feasible to segment the NEPA analysis based on arbitrary prioritization assumptions that may or may not occur.
Berlioux, Pascal	The ponderosa pine vegetation type in the 4FRI DEIS analysis area is dominated by Class 2 functional at-risk 6th level Hydrologic Unit Code (HUC) watersheds on about 451,500 acres or 46 % of the analysis area. Class 3 impaired watersheds represent about 316,800 acres, or about 32 % of the analysis area. Class 1 properly functioning watersheds represent about 220,400 acres, or about 22 % of the analysis area (DEIS p. 107). Per the Specialist report, and as summarized in the 4FRI DEIS, the 4FRI restoration treatments under Alternative B (the Proposed Action) and Alternative C (the Preferred Alternative) are expected to result in an improvement in 23% of Class 2 functioning at-risk watersheds (~104,000 acres), and 42% of Class 3 impaired watersheds (~133,000 acres), with 28 miles of improved water flow regimes overall, including 19 miles in Class 2 watersheds that are functioning at risk and 9 miles in Class 3 watersheds currently impaired (DEIS p. 114). The Eastern Arizona Counties Organization is generally satisfied that the effects of the 4FRI	(76-56) Thank you for your comment.

Berlioux, Pascal	restoration treatments under Alternative B and Alternative C contribute significantly toward the ECO Counties' objectives as expressed in their plans and policies and in these comments. The Eastern Arizona Counties Organization encourages the USFS 4FRI Team to prioritize wherever and whenever possible restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures. Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS	(76-57) See our previous response. Treatments in at-risk watersheds are a high priority.
Berlioux, Pascal	During its participation in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, the Eastern Arizona Counties Organization observed that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Additionally, the site specificity verification process revealed that some of the required Geographic Information System (GIS) data tables or layers were not entered into the official project record. Therefore, the Eastern Arizona Counties Organization is concerned that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data and may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.	(76-58) During this process (from scoping to DEIS to FEIS) , no one has asked for the complete project record, including ECO. Throughout this entire process, we have openly shared our GIS data. It appears to have been usable to those with geospatial technology skills for a particular resource such as wildlife, silviculture and fire. We believe the project record, including all supporting data, has been included. We would welcome you pointing out to us what supporting data or information is missing in our project record.
Berlioux, Pascal	The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team conduct a systemic and systematic review of all technical data, GIS or other, used in their analysis, and ensures that it is included in the 4FRI project record. ECO further suggests that the USFS 4FRI Team use the same methodology of random sampling as used by the DEIS Review Workgroup of the 4FRI Stakeholders Group to statistically verify that all required data is included in the project record.	(76-59) See our response to comment 76-58.

Berlioux, Pascal	During its participation in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, the Eastern Arizona Counties Organization verified to its satisfaction that the required site specificity as regards current condition, desired future condition, prescribed treatment, and site specific effects has been provided in the USFS 4FRI Team analysis process. However, as stated in the above section Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS, the site specificity verification process with the USFS 4FRI Team evidenced to both ECO and the USFS 4FRI Team that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Therefore, the Eastern Arizona Counties Organization is concerned that the difficulty to access site specificity information may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the difficulty to access site specificity information, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.	(76-60) Regarding site specificity, the DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and

Berlioux, Pascal	As discussed with the USFS 4FRI Team, the Eastern Arizona Counties Organization respectfully suggests that the interactive map presented on the 4FRI DEIS website be developed to allow easy 'point and click' access to site specific information such as, but not limited to, current condition, desired future condition, prescribed	documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601).The site-specificity of the analysis was tested by the 4FRI stakeholder group. In response to comments on the DEIS, the stakeholder's wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue (4FRI Stakeholder, 2013 Cara Letter #155). See our previous responses which address the inclusiveness of project record documentation. (76-61) The interactive map is designed to provide people with an alternative method of reviewing maps and alternatives than the traditional poster-sized hard copy. People may still review the project record index and request documents (if not considered to be sensitive information, such has heritage site locations).

treatment, site specific direct and indirect effects, and contribution to cumulative effects, as well as all the technical information regarding all relevant resources as can be conveniently provided. Alternatively, if technical or resource constraints preclude the USFS 4FRI Team to develop the above suggested interactive map, or to make it available to the public, the Eastern Arizona Counties Organization respectfully suggests that a 'point and click' function could provide information on how to procure the desired site specific data from the project record.

(76-62) In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. In the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and ongoing projects by the FS and identified each project by National Forest and Ranger District. Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could

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Cumulative effects Gap analysis Appendix F Cumulative Effects includes a comprehensive list of the past, current and reasonably foreseeable future projects and disturbances included in the cumulative analysis. These projects and disturbances include vegetation projects (mechanical thinning and prescribed fires); recreation projects; other projects; wildfires; insect and disease outbreaks; and, a short discussion of reasonably foreseeable projects with insufficient information for analysis. The list includes projects located on private, State, national forests and other federally managed lands that lie within, adjacent to and outside of the project area. Appendix F Cumulative Effects does not include a discussion of what the cumulative effects of all the projects are, and only includes a brief synopsis of Authorized Livestock Management; Timber Harvest; and, Post-1996 Vegetation Treatments – Uneven-aged Management, Fire Risk, Restoration summarized from the Specialists' reports.

occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 – 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 – 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 – 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321).The above actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects analysis for MSO was revised. The FEIS wildlife report states, “Because of the size of the 4FRI analysis area and the large portion of the western UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects” (Wildlife Report page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers. comm. 2006). Wildlife habitat in the form of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary

Berlioux, Pascal	Chapter 3 Affected Environment and Environmental Consequences addresses extensively the concept of cumulative effects on Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; and, Transportation. However, the format used to discuss the cumulative effects varies considerably from resource to resource. For example, the Soils and Watershed (DEIS p.105-121) and the Terrestrial and Semiaquatic Wildlife and Plants (DEIS p.173-245) sections include fairly comprehensive descriptions of the cumulative effects and of their rationale. Other sections formulate cumulative effects as opinions, or as summary statements that essentially posit that the past or current projects have achieved or are achieving their stated objectives.	have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, table 153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page 400 to page412 of the wildlife report. Similar to MSO, the goshawk cumulative effects analysis has been revised since the DEIS was published, see the FEIS, chapter 3. (76-63) Thank you for your comment. For past actions, the cumulative effects analysis must be consistent with 36 CFR 220.4(f). This regulation incorporates direction from 40 CFR 1508.7 and The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005). FSH 1909.15.3 provides specific direction on determining the spatial and temporal boundaries, two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial boundaries define the affected area for each resource indicator. Affected areas can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. "For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political"(FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose. Regarding the content of the cumulative effects analysis, please see our response to comment 76-62.

Berlioux, Pascal	The Cumulative Effects section itself of Chapter 3 is but a two sentence paragraph that states: "A summary of past, present, and reasonably foreseeable management actions and natural disturbances that were evaluated by most resources is located in appendix F. See the project record for the comprehensive master list of all projects and for additional information on each project" (DEIS p. 331). The Eastern Arizona Counties Organization is generally satisfied that the list of projects considered in the cumulative effect analysis is appropriate, with one notable exception. Since the completion of the 4FRI DEIS, the Flagstaff Watershed Protection Project Proposed Action (PA) has been released (April 2013) and will need to be integrated into the cumulative analysis in the final EIS.	(76-64) Chapter 2 of the FEIS notes that 4FRI treatment acres overlapping with the Flagstaff Watershed Protection Project have been removed from the 4FRI FEIS analysis. See our response to comment 76-62 and 76-63 for a general discussion on cumulative effects.
Berlioux, Pascal	The Eastern Arizona Counties Organization is generally satisfied that the resource specialists have conducted some form of cumulative effects analysis, and ECO realizes that the cumulative effect analysis methodology cannot be identical across resources. However, ECO is concerned that the methodologies for cumulative effects analysis are generally not satisfactorily explained, and may be inconsistent in depth and breadth across resources. ECO is further concerned that the issue of continuity between the project record, the specialists reports, and the DEIS - already identified regarding site specific effects -may also exist regarding cumulative effects. Therefore, the Eastern Arizona Counties Organization is concerned that potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.	(76-65) See previous responses.
Berlioux, Pascal	Suggested action The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team include the Flagstaff Watershed Protection Project Proposed Action (April 2013) in the cumulative analysis in the final EIS. The Eastern Arizona Counties	(76-66) See previous responses.

Organization further respectfully suggests that each resource section of Chapter 3 Affected Environment and Environmental Consequences include a methodology subsection describing the methodology used for cumulative effects analysis. ECO also suggests that the USFS 4FRI Team review methodologies across resources to ensure consistency of depth and breadth of cumulative effects analysis.

Monitoring Gap analysis Appendix E Alternative B through D Monitoring and Adaptive Management Plan offers brief one or two sentence descriptions of: types of monitoring (ecological, implementation, effectiveness, validation and Collaborative Forest Landscape Restoration Act (CFLRA)); monitoring prioritization, scales, question and indicators; and, a ten line description of adaptive management. Appendix E also includes Table 143 Implementation monitoring questions, indicators, frequency of measurement, data source, and cost; Table 144 Landscape-scale effectiveness desired conditions, indicators, frequency of measurement, data source, and cost; and, Table 145 Effectiveness monitoring plan. However, the Eastern Arizona Counties Organization observes that about half of Table 143 Implementation Monitoring is left blank, and for most questions for which the table is not blank, the indicators are crude and the frequency is minimal (typically: annual acres and miles). Table 143 looks more like an annual budgetary reporting table than a project implementation monitoring plan. The quantitative aspect of implementation monitoring seems addressed but the qualitative aspect of implementation monitoring seems largely unaddressed or unanswered. It is surprising that half the table is incomplete, indicating an unfinished product. The Eastern Arizona Counties Organization also observes that Table 142 Monitoring scales, is left incomplete inasmuch as it does not include any monitoring scale below the sub-unit for the 4FRI DEIS. This, too, indicates an unfinished product. Further, there appears to be a gap in the effectiveness monitoring plan inasmuch as most of the treatments focus on achieving treatments objectives and desired conditions at the stand or even group level, while most of the effectiveness monitoring appears to be planned at the landscape scale. The Eastern Arizona Counties Organization further observes that Table 144 Landscape-scale Effectiveness offers a fairly comprehensive list

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(76-68) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. County comments imply the need for a supplemental EIS because the monitoring plan was not complete. In response to comments on the DEIS an agency may: (1) Modify alternatives including the proposed action, (2)Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan.

	of desired future conditions: Conservation of Biological Diversity; Ecosystem Resilience; Water and Air Resources; Economics; Social Systems; and, Heritage Resources. However, the indicators listed are macro level indicators and the frequency of measurement is generally annually or every 5 years, and many sections of the table in the "Data Source/Spatial Scale/Cost" column indicate "No numbers provided." This further indicates an unfinished product.	As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the "Adaptive Management" section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in how the plan questions and indicators are organized and change section name to "Monitoring: Desired Conditions, Indicators, Thresholds and Triggers", (6) Modified the "Monitoring Prioritization" section to reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and change section name to "Prioritization – Monitoring Tiers"; and (7) Modified the "Monitoring Scale" section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix B) informed people that the monitoring pan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species" section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation" section) and the development of the implementation plan (appendix D).
Berlioux, Pascal	The Eastern Arizona Counties Organization also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more of an	(76-69) Thank you for your comment. Please see our response to 76-68 which provides a summary of all updates to the plan between DEIS and

	adaptive management decision matrix than an effectiveness monitoring plan. Adaptive management is addressed in the following section Adaptive Management	FEIS.
Berlioux, Pascal	The Eastern Arizona Counties Organization is concerned that the 4FRI DEIS, the Specialists reports and the project record do not include a specific 'action plan' or 'work plan' and budget, or funding mechanisms, for the monitoring plan. Although the question of who will monitor, and potential funding sources, are nominally mentioned in Table 141 Monitoring plan tiers, the scale, scope and complexity of 4FRI require addressing these questions in a comprehensive fashion that goes well beyond a passing mention in Table 141. How many man-hours will the implementation of the monitoring plan require? Who will provide these man-hours? How much will it cost? How will it be funded? What are the quality control mechanisms to ensure that monitoring itself - if provided by volunteer (amateur?) third parties - meets required criteria? What mechanisms exist to ensure the integrity of the measures? Further, the reliance on "stakeholders" and "multiparty (monitoring boards)" in the 4FRI DEIS monitoring plan tiers (Table 141, DEIS p. 660) raises questions which are left unanswered regarding the functioning of the monitoring plan. For example: What is the USFS mechanism to utilize third party developed monitoring data to make agency action adaptive management decisions? What are the mechanisms to deal with adaptive management decisions that may be of a nature to significantly alter the management actions identified in the Record of Decision? Etc.	76-70) Thank you for your comment. A project work plan is developed each year once the Agency receives its budget as appropriated by Congress. Once the annual budget is available, the Forest Service will work with the Multi-Party Monitoring Board to prioritize monitoring activities. All of these questions will be answered in collaboration with the Multi-Party Monitoring Board as set forth in the collaboratively developed AMMP. These determinations cannot be made until we know more about the available annual budget, the funds that can be leveraged by partners, and the specific monitoring protocols developed by the Forest Service and the monitoring board. The Forest Service will continue to consider new peer-reviewed science as it becomes available. The collection of monitoring data through a third party would be coordinated by the multi-party monitoring board in collaboration with the Forest Service. Once the data is delivered, it will be verified and evaluated through by an interdisciplinary team of resource specialists. The results of the evaluation and the implications of potential adaptive management actions will be provided to the deciding official for a final decision. If monitoring indicates that the environmental effects of each action do not exceed the bounds of those disclosed in the environmental document, and the actions serve to move the project towards the desired conditions, the Forest service can continue implementation as described without the need for new or supplemental NEPA review (FSH 1909.15, 54.1). However, if monitoring indicates that the project is not moving towards the desired condition, the Forest Service will first evaluate design adjustments within the bounds of the management actions already disclosed and analyzed in the environmental document. For example, if the Forest Service were modifying the vegetation within an area according to treatment type UEA25, we may reduce the area occupied by interspace to 25 percent; rather than the maximum allowable of 40 percent. In both cases, the treatment type is the same, but the design change may better move the projects towards the desired condition. "In the case that new information or changed circumstances result in environmental impacts of a proposed action not disclosed or analyzed, further interdisciplinary

Berlioux, Pascal	The Eastern Arizona Counties Organization is further concerned that the ability of the public to review and comment on the 4FRI monitoring 'action plan' or 'work plan' and budget has been compromised inasmuch as even if the USFS 4FRI Team develops such a plan and budget as an outcome of the comments process, the plan will not be available for public review and comments until a notice of decision is published, unless the USFS 4FRI Team decides to release a second 4FRI Draft EIS (DEIS) or a Supplemental EIS (SEIS). Considering that the 4FRI monitoring 'action plan' or 'work plan' and budget currently do not exist, it is not possible to submit substantive comments on them and, therefore, a potential objection could be ineligible based on 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments.	review should occur as described in section 18" (FSH 1909.15, 54.1). (76-71) Thank you for your comments; they have been noted. See previous responses on budget and responses on the completeness of the information provided to the public in the DEIS on monitoring. The monitoring and adaptive management plan was developed in collaboration with stakeholders. Enough information was provided in the DEIS (DEIS Appendix E) to inform the public. Sufficient information was included because many comments were received on the plan, including the need to incorporate the MSO monitoring plan. That document was unavailable at the time the DEIS was released for public comment because it was derived from the FWS biological opinion. However, 36 CFR 218.8 does address new information that was provided to the public after a comment period has been provided, "(c) Issues raised in objections must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector, unless the issue is based on new information that arose after the opportunities for comment" (emphasis added). While there have been updates to the analysis since the DEIS was made available for public comment, the changes from DEIS to FEIS are insignificant or in response to public comments on the DEIS (allowed by CEQ). There is no need for a supplemental DEIS.
Berlioux, Pascal	In contrast, the current Forest Service Manual requirements for Plan Monitoring Program Design (Sec. 1921.51) are extremely specific: "In designing the plan monitoring program, the Responsible Official: 1. Should consider ongoing project and activity monitoring. 2. Should establish and apply a screening process (FSH 1909.12, section 12.1) to ensure that only feasible and meaningful monitoring activities are conducted, and in a manner that is practical and affordable. 3. Should store and manage monitoring data in corporate applications such as Natural Resource Information System whenever the capability exists. 4. Should develop a multi-year monitoring guide that describes protocols, databases, and a monitoring schedule. 5. Shall develop an annual monitoring action or work plan to identify the specific monitoring tasks to be accomplished and the budget and personnel associated with those tasks." The Eastern Arizona Counties Organization fully understands that Sec. 1921.51 was initially written to apply at Forest Plan level, and that the 4FRI DEIS is	(76-72) As you state, the Plan Monitoring Program Design referenced in this comment applies to Land Management Planning (i.e. Forest Plans) and not to project monitoring. Furthermore, "CEQ recognizes that it may not be possible to identify fund from future budgets; however, a commitment to seek funding is considered essential and if it is reasonably foreseeable that fund for implementation of mitigations may be unavailable at any time during the life of the project, the agency should disclose in the EA or EIS the possible lack of funding and assess the resultant environmental effects" (CEQ memorandum 2011). The Forest Service commits to using a portion of its annual funding for monitoring and both the Forest Service and the 4FRI stakeholder groups have committed to seeking additional funds. The updated AMMP clearly states that "budget limitations dictate how much and what type of monitoring can be accomplished. In order to prioritize what monitoring will be accomplished, this plan provides a tiered system for prioritizing monitoring" (DEIS Appendix E). CEQ guidance also provides

nested at project level within the Coconino and Kaibab forest plans. However, CEQ has made very clear that when mitigation is involved in the NEPA analysis – such as the adaptive management mechanism integrated within the 4FRI DEIS – monitoring is automatically invoked. Therefore, the Eastern Arizona Counties Organization is concerned that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular; that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised; and, therefore, the 4FRI Monitoring Plan may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular, and that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised, presents a consistency gap between the 4FRI DEIS and the Counties' objectives as expressed in their plans and policies and in these comments.

Monitoring 'action plan' or 'work plan' The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team include in very specific terms: i) quantitative, qualitative and effectiveness monitoring processes; ii) a monitoring 'action plan' or 'work plan' and budget; and, iii) the resources allocation and funding necessary to implement monitoring in the 4FRI DEIS, to ensure that the monitoring of the 4FRI project implementation is quantifiably and qualitatively implemented. Practically, the Eastern Arizona Counties Organization suggests a three step monitoring process articulated as follows: 1) Quantitative implementation compliance monitoring. The purpose of the quantitative implementation compliance monitoring is to answer the question: "Was the job done?" While, generally, this assessment is made by the Forest Service contract management team when a contractor is involved, it is suggested that

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that "agencies have discretion, within the scope of their authority, to select an appropriate form and method for monitoring" and "possible monitoring methods include agency-specific environmental monitoring, compliance assessment, auditing systems (CEQ memorandum 2011). The AMMP was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively work with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Interested parties may scrutinize the updated monitoring plan and continue to comment. This may occur during the objection period which is designed to allow discussions between the FS and interested parties to explore any changes to the proposed actions. This discussion occurs before the Record of Decision is signed that authorizes project implementation. (76-73) The DEIS identifies design features and mitigation by resource that would apply to any of the action alternatives (DEIS, Appendix C, Table 111, and page 565 to page 599). Appendix D of the DEIS states, "This implementation plan is designed to be integral to the selected alternative and record of decision (ROD). The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Table 112 to table 115 is checklists designed to monitor compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be

this step becomes the beginning of the process rather than what is often the end of it. Specific quantitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 2) Qualitative implementation compliance monitoring. The purpose of the qualitative implementation compliance monitoring is to answer the question: "Was the job done correctly?" The need for qualitative implementation monitoring increases rapidly with the complexity of the actions undertaken. Complex forest restoration prescriptions implemented using designation by description (DxD) or designation by prescription (DxP) create substantial room for interpretation by the operators, and may result in outcomes substantially different on the ground from those intended by the resources specialists who wrote the prescriptions. Verifying that implementation complies not only quantitatively but qualitatively with the management decision is especially important when the third step of monitoring is intended, as effectiveness can only be meaningfully analyzed if the actual treatments outcomes are in compliance with the intended outcomes. Specific qualitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 3) Multi-tier and multiple scales effectiveness monitoring. The purpose of the effectiveness monitoring is to answer the question: "Do the outcomes of the management decision produce the intended effects?" The need for effectiveness monitoring increases rapidly with the complexity and spatial and temporal scopes of the management actions undertaken, especially in projects where cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions. Landscape scale forest restoration over 2 million acres in 20 years, as endeavored in the 4FRI project, is largely inconceivable without the concept of adaptive management. However, adaptive management is but an

consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is also the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions" (DEIS, page 601). Furthermore, appendix E of the FEIS provides a plan for not only additional implementation and compliance monitoring, but also effectiveness monitoring. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively work with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols. The multi-party monitoring board is developed independently within the stakeholder group. If provided prior to publication, a stakeholder developed document outlining the structure of the board can be included in an appendix to the FEIS. As outlined in the collaboratively developed adaptive management and monitoring plan, the multi-party monitoring board will work with the USFS, where appropriate, to oversee monitoring prioritization, implementation, data storage and assessment. Furthermore, the plan states that the

	empty rhetoric, and any management action and the NEPA analysis thereof is flawed, if robust three step monitoring as described here above is not planned and implemented. Specific effectiveness monitoring processes can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. A three functional steps monitoring process articulated as above can be easily adapted to the three priority tiers identified in the 4FRI stakeholders suggested monitoring plan (2012) and the three monitoring scales identified in Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 660). In presenting the above monitoring process, the Eastern Arizona Counties Organization does not intend to propose an alternative to the stakeholders developed Biophysical and Socioeconomic Monitoring for the Desired Conditions of the Four Forest Restoration Initiative plan, but to suggest a framework for the associated monitoring 'action plan' or 'work plan' and budget required under FSM Sec. 1921.51 (4) & (5).	stakeholder group (and by association, the monitoring board) will provide adaptive management recommendations to the Forest Service based on the monitoring information collected.
Berlioux, Pascal	Multi-party monitoring The Eastern Arizona Counties Organization respectfully suggests that the 4FRI DEIS include in very specific terms the requirements for the Responsible Officials to be bound by the findings of multi-party monitoring boards. It is not suggested here that responsible officials surrender their decision making authority to a multi-party monitoring board, or violates the requirements of FACA, but that they should be required to act upon the findings of a multi-party monitoring board in a manner that appropriately addresses the issues raised.	(76-74) As described in appendix E (Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan, also known as the Adaptive Management and Monitoring Plan, or AMMP), the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. The deciding official will then consider potential adaptive management actions and make a final determination. However, the Government cannot surrender its decision making authority to the multi-party monitoring board.
Berlioux, Pascal	Adaptive management Gap analysis The Eastern Arizona Counties Organization observes that the words 'adaptive management' are used in 61 distinct instances throughout the 4FRI DEIS, and that adaptive management is referred to, throughout the entire 4FRI DEIS, as an integral part of the 4FRI project and as a management tool fully integrated in the 4FRI NEPA process. ECO applauds the commitment of the USFS 4FRI Team to adaptive management, as projects on the scale of 4FRI (~2 million acres in 20 years), or even the first DEIS of 4FRI (~1 million acres in 10 years), where direct,	(76-75) The comment refers to the 2012 Planning Rule; however, 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out project or activity". In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring

Berlioux, Pascal	indirect and cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions, are largely inconceivable without the concept of adaptive management. However, the Eastern Arizona Counties Organization observes that aside from a five line description in the Glossary (DEIS p. 341), and a nine line general description in the Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 661-662), there is no presentation or description in the 4FRI DEIS, the specialists reports or the project record, of the adaptive management process. The entire adaptive management plan for the 4FRI project is described as follows: “Monitoring of alternative management actions provides the data for the adaptive management process. As a result of comparing monitoring results to the predicted outcomes, the plan provides a roadmap for adjusting actions or applying new science as long as the anticipated effects are within the scope of impacts analyzed and disclosed in the EIS and record of decision” (DEIS p. 661-662). The fundamental issues of characterization of system uncertainty through multi-model inference; definition of temporal and spatial scales; indicators selection; analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; identification of thresholds; evaluation of strategic alternatives; amplitude, timing, scale and iteration of corrective actions; etc., are left untouched. Additionally, as mentioned in the above section Monitoring, the Eastern Arizona Counties Organization also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more an attempt at an adaptive management decision matrix rather than an effectiveness monitoring plan per se. The table includes some indicators, triggers, and adaptive actions based on landscape scale desired conditions, but many adaptive actions applying to macro level desired conditions are “discontinue” or “prohibit until alternative approach is development (sic)” or “increase” or “re-evaluate”. These are binary or vague. In addition, many of the triggers timelines are 5 or even 10 years long, which may be adapted for some resources, but may not allow, for other resources, the identification of trends, and the implementation of adaptive	(76-76) Thank you for your observations. Please see previous responses.

Berlioux, Pascal	management actions before the entire 4FRI project, or half of it, is completed. Similarly, the few lines of adaptive management narrative are vague and general: “Some of the effectiveness monitoring objectives have adaptive management actions that would be taken if the established thresholds are reached or exceeded. Alternatives B, C, and D have specific adaptive management actions for springs, channels, and roads that have been made part of the alternative (see DEIS chapter 2)” (DEIS p. 662). The Eastern Arizona Counties Organization is concerned that adaptive management is only a concept at this stage; that the specialized techniques and processes of adaptive management may not be fully grasped; and that adaptive management has not been truly engineered into the 4FRI project as an executable management mechanism integral to the 10 year implementation of the 4FRI EIS over one million acres.	(76-77) Thank you for your comment. See previous responses.
Berlioux, Pascal	Further, the Eastern Arizona Counties Organization is concerned by the reaction to date of the USFS 4FRI Team to such observations: “Adaptive management is not a NEPA requirement.” ECO is concerned that, while it is correct that adaptive management is indeed not a NEPA requirement in the 1982 Planning Rule, it has become one under the 2012 Planning Rule (Forest Service Handbook FSH 1909.12 – 41). Maybe more importantly, ECO is concerned that by making adaptive management a key process of the 4FRI NEPA analysis, the USFS 4FRI Team has in effect constrained itself into designing and implementing a true adaptive management process. Therefore, the Eastern Arizona Counties Organization is concerned that the absence of a robust adaptive management process, despite the stated reliance on adaptive management to implement restoration treatments on one million acres over 10 years, may present a process risk for the 4FRI DEIS. Consequently, the Eastern Arizona Counties Organization is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a structured adaptive management plan, presents a consistency gap between the 4FRI DEIS and the Counties’ objectives as expressed in their plans and policies and in these comments.	
Berlioux, Pascal	Suggested action The Eastern Arizona Counties Organization respectfully suggests that the USFS 4FRI Team develop and include in the 4FRI EIS a robust adaptive management plan that includes standardized processes such as: - Characterization of system uncertainty through multi-model inference; - Definition of temporal and spatial scales; - Analysis of indicators selection; - Analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; - Analysis of thresholds; - Analysis of strategic alternatives; and, - Analysis of amplitude, timing, scale and iteration of corrective actions.	(76-80) Thank you for your suggestions. The adaptive management and monitoring plan was developed in collaboration with stakeholder group through an open and public process. This process involved in-depth multi-party discussions on a wide range of socio-economic and ecological issues. Since its inception, the plan was intentionally designed to be a living document that will adapt over the course of the project as information is gained and new questions are revealed. In January of 2014, the current iteration of the adaptive management and monitoring plan was approved by the 4FRI stakeholder group for inclusion into the FEIS. Your participation in that process is appreciated. We feel that the plan is a robust and well thought out document that establishes the proper framework for the Forest Service

		to not only monitor the effects of restoration activities, but also adapt as new information is made available.
Berlioux, Pascal	Planning Process Issues In its review of the proposed directives revising the Forest Service Handbook (FSH 1909.12) and the Forest Service Manual (FSM 1920), and establishing procedures and responsibilities for implementing the 2012 National Forest System Land Management Planning Regulation set out at 36 CFR part 219, the Eastern Arizona Counties Organization identified issues and shortcomings that are likely to affect the 4FRI DEIS. The Eastern Arizona Counties Organization fully understands that the opportunity to comment on the 4FRI DEIS is neither an opportunity to comment on the 2012 Planning Rule, nor on its implementation directives. Nonetheless, precisely because the 4FRI DEIS will establish the parameters for all subsequent management actions in the 4FRI project for the upcoming 10 years or more, ECO believes that it is appropriate for the 4FRI EIS to specifically include and, therefore, integrate into any subsequent management action, guidelines on: i) how to use of best available scientific information to inform the land management planning process; ii) public participation and the role of collaboration; and, iii) the objection process.	(76-81) Please see the responses to the individual issues such as the use of best available science, public participation and the 36 CFR 218 objection process.
Berlioux, Pascal	Use of Best Available Scientific Information to Inform the Land Management Planning Process The Eastern Arizona Counties Organization appreciates and supports the important role given to the use of best available scientific information to inform the land management planning process in the proposed directives and in the 4FRI DEIS. The Eastern Arizona Counties Organization further appreciates and supports the important role given to assessing social and economic sustainability and multiple uses in the assessment process. Issue However, the Eastern Arizona Counties Organization believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials in actually integrating social and economic sustainability and multiple uses, and in integrating social and economic science to the framework of best available scientific information to inform their land management planning process, and their management decision making process. Specifically, the assessment of the social, cultural and economic values becomes essentially an exercise in futility if	(76-82) Thank you for expressing your opinion. Please see all previous responses.

	these values are not reflected in the management decisions, and do not balance other values. This lacking is reflected in the 4FRI DEIS. The Eastern Arizona Counties Organization clearly supports robust science and the full integration of ecological, bio diversity, restoration and conservation values in the management process, and ECO is on record for participating in, and often leading, efforts designed to re-introduce to the ecosystems of eastern Arizona natural ecologically sustainable processes such as a frequent cool surface fire regime. Nevertheless, ECO is observing, and when necessary is committed to mitigate, a tendency to develop and implement pure, uncompromised and uncompromising science, or the currently accepted state of best science - which often proves to be a temporary state, to the detriment of the enjoyment, custom, culture, health, safety and economic well-being of the people. Additionally, the Eastern Arizona Counties Organization is also observing, and when necessary is also committed to mitigate, the fact that the same temptation to develop and implement pure, uncompromised and uncompromising science, also often causes the weakening of the social consensus with stakeholders who would support the implementation of management decisions based on a balanced approach, but are unwilling to support the invasive implementation of a monolithic and intransigent interpretation of science. For example, many stakeholders are reluctant to support unconditionally the 4FRI DEIS, owing to the science-based decision to cut some of the large trees necessary for the development of the future old growth, in order to create regeneration openings in the name of scientifically driven silviculture. Such decisions may make sense at group level, in forests featuring well balanced classes of vegetative structural stages (VSS), but are difficult to support at stand level or forest level in forests where older VSS classes (VSS 5 and 6) are in recognized deficit at landscape scale, while younger VSS classes (VSS 2, 3 and 4) are overabundant, choke the landscape, and transform it into a ticking fire bomb. Suggested action The Eastern Arizona Counties Organization suggests that the 4FRI EIS provide clear and unambiguous guidelines to responsible officials to integrate social sustainability and social science into the framework of best available scientific information to	
Berlioux, Pascal		(76-83) Thank you for your input. The 4FRI DEIS as well as the FEIS have been informed by a collaborative processes, and as such have integrated input from a multitude of publics. Only one alternative is a "pure-best available science" alternative, the considered but eliminated

	inform their management decision making process. Specifically, the Eastern Arizona Counties Organization suggests that the 4FRI EIS guide responsible officials to implement substantive - even though possibly scientifically imperfect - management actions that move the ecosystems significantly toward the desired future conditions, when such actions are supported by social consensus, rather than spend years attempting to forcibly impose management actions that may be deemed scientifically more perfect but that do not benefit from the support of the social consensus. In other words, ECO suggests that the 4FRI EIS emphasize executing well less than perfect projects now, over developing scientifically perfect projects that are not implemented. To quote a famous Arizonan: "Extremism in the defense of liberty is no vice" (Barry Goldwater), but the Eastern Arizona Counties Organization would like to propose to the USFS 4FRI Team that extremism in the pursuit of best available scientific information (BASI) may become counterproductive when it results in paralysis by analysis, or inaction by litigation. Public Participation and the Role of Collaboration The Eastern Arizona Counties Organization appreciates and supports the important role given to public participation and the role of collaboration in the proposed directives and in the 4FRI DEIS. Issue However, the Eastern Arizona Counties Organization believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials on two fundamental and overlapping aspects of public participation and the role of collaboration. Specifically: i) sustained and meaningful public participation and engagement require that the public's input actually influence substantially the decision making process; and, ii) sustained and meaningful collaboration requires that the products of collaboration be honored by the Forest Service. This lacking is reflected in the 4FRI DEIS. The Eastern Arizona Counties Organization has acquired a long, ineffective, inefficient, unproductive and oftentimes frustrating experience of responsible officials paying lip service to public participation and to the role of collaboration, and ECO believes that the 4FRI EIS must focus the concept of public participation and collaboration away from complying with a process and 'managing the problem,' toward	alternative in the FEIS that examined full restoration. All other alternatives within the analysis have a social component to them, but are driven primarily by best available science.
Berlioux, Pascal		We beg to differ that the roll of public input has not played a role in the 4FRI process. For example, in the DEIS, the stakeholder created old tree implementation plan (Appendix D, Section C-DEIS page 644-45) and the modified large tree implementation plan (Appendix D, section C)-DEIS page 646-654). The FEIS is even more explicit with examples of input from publics, including inclusion of the 4FRI stakeholders collaboratively developed monitoring and adaptive management plan in Appendix E, increased clarity of the importance of large trees in Chapter 1 purpose and need, clarity of language concerning heterogeneity in the implementation plan, clarity and an increased emphasis on large tree concerns on 38,260 acres of treatments outside the WUI in the Implementation Plan (Appendix C of the FEIS) are a few examples of public input being taken seriously and integrated into the 4FRI FEIS. The draft record of decision includes these inputs which displays a commitment from the deciding officials that public input and collaboration is meaningful. Please see the response below to #76-85.

	developing executable products and 'resolving the problem.'	
Berlioux, Pascal	Objection Process The Eastern Arizona Counties Organization appreciates the attempt made by the Forest Service to: i) allow the public a more effective involvement; ii) support the collaborative processes; and, iii) develop better decision-making (U.S. Forest Service Chief Tom Tidwell) by replacing the previous appeal process with the new pre-decisional administrative review, or "objection process", to be applied under federal regulation to all projects and activities that implement land-management plans and that are documented in an environmental assessment or environmental impact statement. The Eastern Arizona Counties Organization acknowledges that the U.S. Forest Service announced on March 26, 2013 the final rule governing the objection process for projects and activities implementing land-management plans, and that the final rule was published in the Federal Register on March 27, 2013 after a review of public comments submitted in response to the publication of the proposed rule in 2012. Consequently, ECO fully understands that this comments letter is not an opportunity to comment on the objection process.	(76-85) Thank you for your comment.
Berlioux, Pascal	Issue However, the Eastern Arizona Counties Organization believes that the recent decision made by the Forest Service to replace the previous appeal process with the new objection process in the 4FRI NEPA process does provide an opportunity to address concerns about the objection process implementation, as follows. Among other significant differences, a critical difference between the previous appeal process and the new objection process is that an objection must be filed prior to an actual decision being made and published. This creates a potentially difficult situation inasmuch as there is a possibility, and in certain cases a probability, that several objections may be filed by several different parties, and that the resolution of these objections may result in a final decision significantly different from the one disclosed in the document published with the notice of a plan subject to objection. Although the list of objections will be public, the timing of filing of potential objections within the objections filing period may result in the requirement for the public to decide to file, or to abstain to file an objection based on the speculation of what other parties may decide	(76-86) Thank you for expressing your concern with the 218 objection process.

Berlioux, Pascal	to file, and what the resolutions to such objections might be. Additionally, since a final decision may be influenced significantly by the resolution of an objection that, by definition, happens only after the comments period is closed, parties may be unwillingly put in a situation where, per 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments, their potential objection may be ineligible. Additionally, the Eastern Arizona Counties Organization is concerned that Chapter 50 Objection Process in general, section 51.66 - Reviewing Officer Response to Objections and section 51.6 - Resolution of Objections in particular, and specifically section 51.6 paragraph 4: "The reviewing officer responds to the outstanding issues in the objection; The reviewing officer's response may include instructions to the responsible official as part of the disposition of the objection. The response must be sent to the objecting party(ies) by certified mail, return receipt requested, and posted online" (36 CFR 219.57(b) and sec. 51.64) are focused on the administrative process of disposing of an objection, rather than on the substantial process of actually resolving it. Suggested action The Eastern Arizona Counties Organization suggests that the 4FRI EIS guide the reviewing officers to exercise careful judgment in their resolution or rejection of objections, in relation to the true material importance of the objections – as opposed to their symbolic or emotional importance, and the potential effect of litigation on the implementation of the project. ECO suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' objections, and the major benefits attached to sustaining the 4FRI social license. In so suggesting, the Eastern Arizona Counties Organization wants to emphasize that it does not promote indiscriminate and aberrant acceptance of any and all parties' whims or irrational demands, but a well-considered costs and benefits analysis by Forest Service responsible officials, line officers and reviewing officers of public input in their decision process in view of the relative actual significance or lack thereof of such input, and the overwhelming urgency to act, even if imperfectly in some specific cases, such as the protection of the forests of eastern Arizona against catastrophic	(76-87) Thank you for interest in and concern for this restoration project.

	landscape scale wildfires.	
Berlioux, Pascal	Summary In summary, the Eastern Arizona Counties Organization wants to re-state its overwhelming support for the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the suggestions provided by ECO and other stakeholders integral to the sustainability of the 4FRI social license. Therefore, the concerns and suggestions provided by the Eastern Arizona Counties Organization are not aimed at questioning the need to implement 4FRI, but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process that could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project, as intended by ECO and the ECO Counties.	(76-93) Thank you for your comments and support of this landscape-level restoration effort.
Berlioux, Pascal	The Eastern Arizona Counties Organization is fully aware that per Sec. 1503.4 Response to comments, the USFS 4FRI Team may elect to "Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate,indicate those circumstances which would trigger agency reappraisal or further response" (Sub Sec. 5). However, this is not the expectation of ECO. Rather, ECO expects that the USFS 4FRI Team will receive ECO's comments in the spirit of continuous improvement and risk mitigation in which they were written, and elect to "Modify alternatives including the proposed action" (Sub Sec. 1), and "Supplement, improve, or modify its analyses" (Sub Sec. 3) as allowed for under Sec. 1503.4.	(76-89) Your comments have been noted. Thank you for your involvement in the 4FRI DEIS comment process. The FEIS does contain changes based on comments received from the DEIS and we appreciate the clarity that our commenters have provided to improve the FEIS from the DEIS.
Berlioux, Pascal	The Eastern Arizona Counties Organization respectfully submits that the above comments and suggestions are substantive in nature and warrant careful consideration and adoption by the Forest Service. The Eastern Arizona Counties Organization requests to be kept informed as the 4FRI NEPA process progress; hereby reserves its right to provide further comments as the process unfolds; and, requests that the Forest Service commit to receiving and integrating further comments from ECO as provided. The Eastern Arizona Counties Organization appreciates the opportunity to comment on the 4FRI DEIS and thanks the USFS 4FRI Team for this opportunity. ECO is committed to partner with the U.S. Forest Service to meet the ECO Counties' residents' and visitors' enjoyment, custom, culture, health,	(76-90) Thank you for your comments.

	security and economic well-being needs.	
Berlioux, Pascal	Suggested action The Eastern Arizona Counties Organization recognizes that under current federal statutes Forest Service line officers are not allowed to share their decision making authority. Nonetheless, ECO believes that a statutory monopoly of decision making authority does not necessarily imply an operational monopoly on decision content. Therefore, ECO suggests that the 4FRI EIS emphasize that while the line officers retain their sole legal ability to make the decision, they are also required by law and regulation "to meet the needs of present and future generations" (Forest Service Mission Statement), as expressed through true public participation and collaboration, and meaningful consistency reviews with the local governments' objectives, among other channels. The Eastern Arizona Counties Organization further suggests that the 4FRI EIS guide responsible officials in retaining their legal decision making authority while allowing the public to participate meaningfully in, influence substantially, and, when appropriate, contribute to alter the content of their decision.	(76-91) The 4FRI planning effort has lived up to the spirit of authentic collaboration since the inception of the idea to restore 2.4 million acres across northern Arizona. A working relationship was built with the stakeholder's group, and beginning in 2010, collaborative planning efforts include but are not limited to, the use of the stakeholder's Landscape Restoration Strategy to inform the purpose and need and proposed action for this project. In addition, the stakeholder group produced the Large Tree Retention and Old Growth Protection Strategy which was used to inform alternatives and the modified version is incorporated in the project's implementation plan. The collaborative effort continues with the participation of the stakeholder group in developing the adaptive management and monitoring plan which is included in the FEIS. Evaluating monitoring information and data gathered about the ecological and socioeconomic components affected by restoration activities creates the feedback necessary for making any adaptive management decisions. As described in appendix E and the AMMP, the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. Because the Forest Service can neither abdicate its legal responsibilities nor delegate decision-making to the collaborative group, the deciding official will consider potential adaptive management actions and make a final determination. All collaborative decisions still need to move through procedures for agency evaluation and accountability.
Berlioux, Pascal	Please find attached the Eastern Arizona Counties Organization comments on the 4FRI DEIS.	(133-1) This letter is a duplicate of ECO's comment letter #76.
Beste, Carolyn	I am writing In opposition to the Proposed Four Forest Restoration Initiative EIS: Kaibob and Coconino # 34857. The project is designed with the full knowledge that implementation will harm humans and wildlife. The civil rights of the most weak and vulnerable citizens are suborned to the economic interests of the ecosystem industry by such a project. I am one of the most weak and vulnerable citizens whose genetic predisposition combined with previous environmental insults place me at great risk of death and or injury when assaulted by airborne environmental toxins. Please stop the federal funding of actions that are absolutely certain to cause suffering when there are	(159-1) Thank you for your comment. Please see our responses to letters 6 and 11.

	an array of other means to address the potential consequences of forest fires.	
Beste, Michael	I object to this project. I grew up in AZ and enjoyed the fact that AZ had the largest contiguous ponderosa pine forest in the world. I do not consider this tree to be a "weed". Also burning on this scale will degrade air quality and I especially do not want to be subjected to various exposures to particulates from these burns. I am the full time care giver to my wife and her health would be severely impacted by exposure to the degraded air from these fires. I object to your proposed program based on the threat to our health.	(160-1) Thank you for your comment. Please see our response to letter 6 and 11. These responses include all the emission reduction techniques that would be used during implementation.
Bickel, Bettina	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including	Thank you for your comment. Please see our response to Letter #19.

	Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Blakemore, Sally	Although I completely understand forest maintenance mainly because I have lived through multiple fire storms in New Mexico, this burn seems excessive. The logging company allowance seems extreme as well. The Ponderosa Pines and surrounding forest are protected habitat for the Mexican spotted owl. So many habitats are being destroyed by the drought alone, but this excessive relandscaping is going to harm the animals by such a massive removal in one swoop. I would suggest a more gradual forest thinning method.	(87-1) Thank you for your comment. The 4FRI restoration treatments are expected to be implemented over 20 years and appendix G of the DEIS explains about bridge habitat that will be incorporated into the implementation plan for the canopy-dependent species.
Blat, Anja	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife	(70-1) Thank you for your comments. Please see the response to letter #19.

	species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Boggs, Denise	Please use this version of DEIS comments with contact information included. On behalf of the Conservation Congress and WildEarth Guardians I am submitting the attached DEIS 4FRI comments, a memo insert from WEG, and a copy of WEG's comments on the Draft Recovery Plan for the MSO. Please incorporate these documents into the administrative record and keep us on the mailing list for the FEIS. We also request that all associated specialist reports and USFWS consultation documents be posted on the Coconino website for this project. Hard copies of these three documents were mailed to the	Per request from Denise Boggs on March 28, 2013, this letter is superseded by letter #137 received on March 28, 2013. Previous letters 107 and 115 are obsolete. (115-2) See 115-1. Thank you for your comment. The DEIS and specialist reports were made available on the project's website at: http://www.fs.usda.gov/main/4fri/planning in February and March of

Supervisor's office today.

2013. The FEIS and the specialist reports will be made available on this website and via DVD if requested. The Biological Assessment and the Biological Opinion (BO) will be made part of the FEIS as an appendix.

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I. INTRODUCTION. The proposed project is a very ambitious scheme for manipulation of vegetation. Almost 600,000 acres would be treated mechanically or with fire, or with a combination of these methods. DEIS at 3. The result would be a considerable reduction in tree density throughout most of the project area, occurring over the project's relatively short implementation time, which would be 10 years, or until objectives are met. DEIS at 40. We do not believe that such a reduction in tree density is necessary or appropriate, especially in such a short time frame. It appears that the Forest Service, in its zeal to restore what it believes is the historical vegetation structure and composition of the landscape, is willing to sacrifice wildlife habitat for a threatened species (Mexican spotted owl –"MSO"), a prominent sensitive species (northern goshawk), and probably many other species. This is not an acceptable trade-off.

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II. A PROJECT OF THE MAGNITUDE PROPOSED IS NEITHER NEEDED NOR APPROPRIATE. It has long been assumed that nearly all ponderosa pine stands were affected solely by frequent, low-intensity fire, resulting in low-density, widely-spaced stands. However, recent research shows this is not true. While low-intensity fires certainly did occur in this ecological type, there were also mixed- and high-severity fires. One recent study examined the historical fire regimes in four areas, two of which were in Arizona. One of those, the Mogollon Plateau, includes about a third of the project area. The researchers found that historically, 23.1 percent of this area had a mixed-severity fire regime and 14.5 percent had high severity regime. See Williams and Baker, 2012. Thus some parts of the project area historically had dense stands and stand-replacing fires.

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Whatever the need or desire to reduce the density of trees in the project area, the proposed project is much too large. Treating almost 590,000 acres of the 988,674-acre project area (DEIS at 3) in as little as 10 years (id. at 40) would adversely affect many resources. Some of the effects, such as how MSO and its habitat would be affected, are not fully known. (See further discussion in section V below.)

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We also note that Restoration Unit 5 is already very open, as 55 percent of this area is rated as having an open/very open canopy, and only 10 percent has a closed canopy. DEIS at 10. But even so, much of this area is still proposed for treatment, including a large area that is shown as being mostly very open/open . Compare map of Proposed Treatments – Alternative C, with DEIS Figure 6, p. 10.

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A much smaller project should at least be considered. We recommend that any treatments, particularly those in MSO and Goshawk habitat, be implemented on only limited acreages in a few areas at first. Implementation and effects must be rigorously monitored. The data gathered must then be evaluated to assess the severity of impacts to these species, as well as to watershed, soils, recreation, scenery, etc., and adjustments made to design and implementation as needed to decrease adverse impacts before further treatment is done. To the extent that forest structure needs to be restored (per the purpose and need for the project – DEIS at 9), it would be better to accomplish this gradually to

avoid the shock to various resources, such as quickly opening up dense stands in goshawk habitat. (See section VI below for further discussion.)

III. COMPREHENSIVE MONITORING MUST BE ASSURED PRIOR TO PROJECT APPROVAL. In a large project such as the one under consideration, impacts from implementation on many resources could occur across a large area. Monitoring is essential to insure that changes are made in implementation and application of mitigation so that impacts do not get out of control. That is, adaptive management is needed. The DEIS states that: Adaptive management refers to a "rigorous approach for learning through deliberately designing and applying management actions as experiments". Id. at 661; citation omitted. Comprehensive and rigorous monitoring is absolutely essential for adaptive management. However, the monitoring plan in DEIS Appendix E is incomplete. Monitoring would have three tiers of priority, but only tier one would be funded with appropriated money. DEIS at 660. The funded monitoring would only cover implementation monitoring, i. e., determining whether project components were carried out. Ibid. The other tiers, and all effectiveness monitoring, would depend at least in part on money from various partners. Ibid. In the tables of monitoring elements that follow, most of the measures do not state the priority. Thus it is not clear that sufficient money will be available for all the monitoring that must be done to assure adaptive management can be applied. For many of the monitoring questions in Table 143, implementation monitoring (pp. 663 et seq.), there are no "monitoring indicators" showing how the question would be answered. Table 144 (pp. 666 et seq.) has no "triggers", i. e., thresholds indicating a possible need for change. Trigger points for monitoring goshawk will not be set until the "monitoring plan [for the Kaibab NF] become available". Id. at 672. We find no mention at all of monitoring goshawk populations or habitat for the Coconino NF. Given the possibly serious adverse impacts to goshawk from the project (see section VI below), this is a critical omission. There is no provision for monitoring effects to MSO. Even with deferral to the Fish and Wildlife Service, this is not acceptable, as is discussed below in section V. In short, the monitoring plan is not sufficient to ensure that needed monitoring will take place as the project is implemented. The project must not be approved before a more solid monitoring plan, with assurances of

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adequate funding, is in place.

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IV. THE DEIS DOES NOT ANALYZE A SUFFICIENT RANGE OF ALTERNATIVES. In addition to the required no action alternative, the DEIS analyzes three action alternatives – B, C, and D. These alternatives are very similar and produce the same results. All three of the action alternatives have the same design features (DEIS at 63, Appendix C), and the same road mileage (id. at 74). Many other features of the project are identical across these three alternatives. Id. at 95. There is a relatively small difference in the acreage to be mechanically treated . Ibid. This contradicts case law: "Consideration of alternatives which lead to similar results is not sufficient under NEPA". State of California v. Block, 690 F. 2d 753 (9th Cir. 1982). The Forest Service never seriously considered treating a smaller acreage of land, carefully monitoring and analyzing the effects and effectiveness of treatment, and then deciding how to proceed. Such an alternative could have partially met the purpose and need for the project, as described at DEIS p. 9. In designing and implementing projects, agencies have a responsibility under NEPA to examine alternatives that will minimize impacts. See 42 U.S.C. 4321 et seq. The DEIS does not comply with the Council on Environmental Quality Regulations implementing NEPA, which require agencies to "rigorously explore and objectively evaluate all reasonable alternatives. 40 CFR 1502.14(a). It also contradicts case law: an agency may not "disregard alternatives because they do not offer a complete solution to the problem." NRDC v. Morton, 458 F. 2d at 836." Id. at 1154.

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The Forest Service would add to the problem of NEPA inadequacy by not doing any project-specific NEPA for activities implemented under the overall project described in the DEIS. Part of the introduction to DEIS Appendix D states: The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. DEIS at 601. However, Appendix D consists of check lists for responsible officials to use when implementing projects, and direction for how to implement site-specific projects. It does not disclose impacts from such implementation, nor does it obviate the need for project-specific NEPA. A programmatic EIS like the current one cannot cover all site-specific issues and impacts. Additional NEPA will be needed for at least some of the activity carried out under the larger project.

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V. TOO MUCH MSO HABITAT WOULD BE TREATED. A. Large trees are very important. The project area is all or mostly in the Upper Gila Mountains Ecological Management Unit (EMU). This EMU has 52% of all known MSO sites in the U. S. FWS, 2012 at 25. Thus protection of this habitat is very important for the survival and recovery of MSO over the short- and long-term. MSO can nest in trees of various sizes, but nests are typically in large trees, with the average size of a nest tree being 24 inches in diameter. FWS, 2012, at 24. The DEIS states that there is a deficit of large trees, i. e., those at least 18 inches in diameter. DEIS at 14, 179. Under the current MSO Recovery Plan , trees at least 16 inches in diameter should contribute at least 50 percent of the basal area (BA). FWS, 2012, at 277. Thus the larger trees should not be cut. Some post-settlement trees 16 inches in diameter and larger should be retained to serve as replacement trees for large pre-settlement trees, some of which may die over the next decade from bark beetle attack. (See DEIS at 684.) The information on size limits of trees that might be cut in MSO habitat is confusing. Trees greater than 24 inches in diameter in pine-oak forests would be retained. Coconino Plan 65-4, DEIS at 451. Trees up to 16 inches in diameter could be cut in 19 PACs under the proposed amendment to the Coconino Plan. DEIS at 447-448. On p. 505, the limit is 18 inches. The implementation Plan for the action alternatives mentions an upper diameter limit for PACs, but it is not specified. Id. at 610. In

Boggs, Denise	restricted habitat, trees greater than 24 inches would be retained (id. at 612) , but ponderosa pine trees up to 18 inches could be cut if they did not meet the old-tree definition and met some other conditions. Id. at 613. The same is true for target habitat. Id. at 614. The Forest Service needs to simplify and clarify what sizes of trees can be cut and where, especially in MSO habitat. We recommend that trees over 14 inches be retained, and that no trees over 16 inches be cut. B. Too much acreage within MSO protected activity centers would be treated. The DEIS states that MSO habitat is at risk because of mortality risk from high tree density. DEIS at 179. However, recent research shows that at least northern and California spotted owls can survive and use habitat post-fire. See Bond et al, 2002, 2009. Some anecdotal evidence shows that MSO continue to occupy areas that burned at moderate or high severity. FWS, 2012, at 36. This does not mean that stand-replacement fire poses no threat to MSO habitat, but it does suggest that the effects of fire may not be as bad as previously suspected, and that less treatment in protected activity centers (PACs) is needed than is proposed. MSO habitat is typically dense, with high canopy closure. FWS, 2012, at 25. Thus this habitat will always be at least somewhat susceptible to stand replacement fire. To significantly reduce the fire threat, the tree density and canopy closure would have to be greatly reduced, which would in turn degrade or destroy the habitat value for MSO. Under preferred alternative C, 18 of 72 occupied MSO PACs would be treated. DEIS at 81, 178. In the Knob Creek PAC, mechanical treatment is recommended, including in the nest core. WR at 518.	
Boggs, Denise	Forest Plan amendments would be needed to allow this. These significant amendments should be analyzed in a separate EIS in order to comply with NEPA. These amendments would remove the limit on cutting in PACs, and also remove the requirement that an equal amount of untreated PACs be established as controls. Id. at 41; see also id. at 448. Specifically, timber harvest would be allowed for "habitat structural improvement". Id. at 446.	The amendments that are proposed for the different alternatives have been analyzed and have been determined to be site-specific nonsignificant forest plan amendments (see the following pages in the DEIS for the significance evaluation): pages 455-457 for alternative B amendment 1 Coconino NF: pages 494-497 for alternative B amendment 2 Kaibab NF; pages 517-518 alternative C amendment 1 Coconino NF; pages 560-562 alternative C amendment 3 Kaibab NF; for alternative D the analysis done for alternative B would have the same results for alternative D for both forest (page 563). A new EIS is not needed for the proposed amendments. While the DEIS proposed plan amendments change the size of trees that can be mechanically treated within the PAC, each alternative has a size limit that can be removed up to (see pages 447 and 508). The proposal to amend the Coconino NF forest plan to allow for treatment in the PAC to help improve habitat structure is consistent with the 2012 Revised MSO Recovery Plan. Techinically, new EISs are being prepared in the form of the revised forest plans. The Kaibab NF Revised Forest Plan Record of Decision was signed in February of 2014. While the amendments would remove monitoring requirements that reflect the former MSO Recovery Plan, the FWS Biological Opinion would provide the required monitoring that is entirely consistent and compliant with the 2012 MSO Revised Recovery Plan.
Boggs, Denise	However, the 2012 Recovery Plan states: For each planned treatment(s) [in PACs], monitoring should be designed to robustly contrast a set of reference PACs (with no planned treatments) to a set of treatment PACs. … Reference PACs should match the environmental conditions in PACs	

where treatments are planned, as closely as possible. FWS, 2012 at 282. There is no indication in the DEIS that any such controls would be established, or that the required monitoring would take place. Appendix E, for example, has no measures for monitoring MSO. Existing monitoring is highly variable, as some PACs never or seldom get monitored. DEIS at 178. The DEIS states that the Forest Service will defer to the Fish and Wildlife Service's biological opinion for the project. Id. at 439, 457. While that BO will finalize the requirements for monitoring, it is not acceptable for the DEIS to say nothing about monitoring. The action agency, which in this case is the USFS, must include a monitoring plan for the MSO or else it is in violation of the ESA. Monitoring is critically important for reducing impacts to species like MSO. (See discussion in section III above.) The Forest Service should provide at least an outline and some details of what might be monitored, and how, and what monitoring results might trigger a change in project implementation. Given the importance of this issue, the public deserves an opportunity to comment prior to project approval. Note that the Recovery Plan states that the effects of silvicultural and fire treatments on owl PAC habitat is not fully known, and that monitoring can provide valuable information on the effects on owls and their habitat. FWS, 2012, at 282. Id. at 262 states: Monitoring must be designed and implemented to evaluate effects of treatments on owls and retention of or movement towards desired conditions. Allowing the Extension]public to comment[auto-markup end] on some aspects of monitoring could help improve the final monitoring scheme. Conversely, providing no details on monitoring until after the Extension]comment period[auto-markup end] closes leaves the public in the dark and does not inspire confidence that project implementation will be changed if needed to protect MSO habitat. Thus it is not clear that the proposed plan amendments and the proposed projects implemented under them would comply with the current Recovery Plan.

The total amount of land to be mechanically treated in these 18 PACs would be 10,741 acres. DEIS at 83. This averages out to approximately 597 acres per PAC treated. Note that the minimum size for a PAC is 600 acres, FWS, 2012, at 258, 260; Coconino Forest Plan at 65-1. In other words, almost all the acreage in minimum-sized PACs would be treated. This would not even allow the 100-acre core areas around known nest or roost sites to be left untreated, as called for in DEIS Appendix D (DEIS at 610). The EIS should provide more information on the individual PACs, particularly the size of each territory including the amount of nesting, roosting, foraging, and dispersal habitat. Unless all are significantly above minimum habitat thresholds, far too much area within each territory would be cut under the proposed action. The existing basal area (BA) in MSO protected habitat is 155 square feet per acre. DEIS at 14. The desired BA is 150. Id. at 610. It should not require treatment on as nearly as many acres in PACs as is proposed to reach the desired BA. MSO nesting and roosting habitat is naturally dense and should remain that way, so no treatment is needed. However, the minimum BA in PACs under preferred alternative C would be only 110. Id. at 610. That is not a very dense stand at all. To achieve BA of 110 would only require 110 trees per acre that were 13.54 inches in diameter . If such trees were evenly spaced, their trunks would be almost 20 feet apart. The Implementation Plan and project design criteria should require maintenance of a considerably higher basal area for each PAC. All types of MSO habitat in the project area are deficient in snags. DEIS Table 7, p. 14. Logging

Boggs, Denise could remove existing snags and/or trees that will become future snags. Snags and dying trees are typically cut in logging operations for safety reasons.

The proposed treatment in PACs violates the latest MSO Recovery Plan: Treatments should be located strategically and informed by fire behavior modeling across the greater landscape. Results of such modeling will allow managers to optimize placement of treatments, thus ensuring maximum reduction in risk of severe fires while

Boggs, Denise simultaneously minimizing area treated in PACs. FWS, 2012, at 258. The Recovery Plan also states to emphasize treatments outside PACs.

Id. at 288. We are also concerned about the use of (supposed) low-severity fire in all 72 MSO PACs, outside of core areas. See DEIS at 40, 611. According to DEIS p. 184, even core areas could be burned outside the March 1 to August 31 breeding season. This is further confirmed by a summary of the proposed forest plan amendments, which would allow prescribed burning in 56 core areas on the Coconino National Forest. Id. at 81, 439. Under the proposed action, 112,546 acres of MSO habitat would be burned. Ibid. This is 100 percent of MSO habitat in the analysis area. See id. at 123. The Recovery Plan does allow "light burning of surface and low-lying fuels" during the non-breeding season (FWS, 2012, at 261-262). However, if the current condition of forested MSO habitat in the project area is overly dense, as described throughout the DEIS (e. g., at 14), how could fire safely be used in PACs (where the density is likely high), especially in ones that were not first mechanically treated? The DEIS discusses the difficulties and dangers of burning, noting that a high-intensity surface fire could cause a crown fire with extensive mortality (id. at 21), and that it would be difficult and expensive to burn in PACs (id. at 501). Fires, especially those that were not low in intensity, could also burn up coarse woody debris, making it difficult to meet the desired condition for that important element of MSO habitat. (See DEIS at 611, FWS, 2011 at 261.)

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The Implementation Plan refers to Table II B 1 of the 1995 Recovery Plan (FWS, 1995) for both threshold and target habitats. DEIS at 612, 614. The Forest Service should use the 2012 Recovery Plan. Note there is a difference in the requirements for these type of habitats, which are now called "recovery" habitat : the 2012 Plan requires that greater than 30 percent of the BA in each area managed for recovery habitat must be in each of the 12-18 inch and greater-than- 18- inch size classes in both the mixed conifer and pine-oak types. FWS, 2012, at 278. Under the 1995 Recovery Plan, 10 percent of the stand density of trees had to be in each of the following classes: 12-18 inches, 18-24 inches, and greater than 24 inches, for mixed conifer, and 15 percent in each class for pine-oak. FWS, 1995 at 92.

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It is not clear if "stand density of trees" in the 1995 Recovery Plan is percent of stand density index or a percent of all the trees present. If it is the latter, it is similar to BA in the 2012 Plan. In any case,

requirements for retaining medium- and larger-sized trees in recovery habitat, i. e., restricted habitat that is currently unoccupied by MSO but that is the most likely to become (or already is) good habitat for this species, have increased. The information in the DEIS does not provide a way to determine if the proposed project would meet these new requirements. Failure to use the most current Recovery Plan is a violation of the ESA.

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D. 2012 Recovery Plan. It is clear the DEIS failed to use the current Recovery Plan. We are including an 8-page excerpt of cites from the 2012 Recovery Plan, the majority of which are being violated in this DEIS. We call your specific attention to the area in yellow highlighter on pages 3 & 4. This citation concludes "The Recovery Team recommends mechanical treatment in PACs ONLY if such monitoring occurs." P. 73. The DEIS has not included information demonstrating this monitoring has been done, and we don't believe it has been done based on the documentation provided. Appendix D in the 2012 Recovery Plan contains the protocol surveys required for MSO before management activities may occur. The DEIS is silent on this issue.

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The following is a summary of the Biological Opinion that accompanied the Revised Recovery Plan and was written by WildEarth Guardians: Approximately 90% of the population of MSOs exists in the national forests of the southwestern United States. Accordingly, the FWS has always acknowledged that the USFS has a special role to play in the conservation and recovery of the MSO. Yet – now that we are two decades from listing – federal managers (including the USFS and the FWS) operate in an environment of extreme uncertainty. This uncertainty is, in large part, attributable to the failures of the USFS over the last two decades to put together critical information concerning MSO conservation. First, the USFS has failed to acquire basic baseline information as to the population trend of the Mexican spotted owl. Without this core population trend data, adaptive management is impossible. Second, the USFS has failed to acquire any information as to the cause-effect relationship between its forest treatments and MSO demographics. Under these circumstances, caution is indicated. This is particularly true in light of the fact that the available population trend data indicates that the MSO's population has not rebounded since listing. In fact, available studies show that populations have been declining. Despite the clear need for caution, the USFS has chosen another course with its various "landscape-restoration projects" such as 4FRI. These projects emphasize much more thinning and mechanical treatment in PACs and restricted habitat than allowed by the 1996

S/Gs. In one instance, the FWS characterized projects like this as those that are most likely to imperil the MSO's future survival. It is irrational for the FWS and USFS to use the threat of habitat-destroying fire as a pretext for the USFS's increasingly aggressive land management projects because the best and most recent scientific evidence – developed by the USFS itself – shows that MSOs not only survive, but thrive, in a post-fire environment. Under these circumstances – where the USFS has failed to acquire core population data and where the USFS has failed to acquire core information as to cause-effect relationships – any claim that the USFS is implementing "adaptive management" is absurd. In this light, the FWS's no-jeopardy opinions are simply arbitrary and capricious.

E. CEA for MSO Inadequate There is no cumulative effects analysis for the MSO in the DEIS – none. There is limited and inconclusive information in the Wildlife Report that does not replace the NEPA required cumulative effects analysis. The following exceprts are taken from the Wildlife Report. Total acres of treatment in MSO habitat within reasonably foreseeable projects are not yet known because projects are still in the planning stages. However, the best estimate at this time includes about 10,155 acres of protected habitat (Table 205) and approximately 23,800 acres of restricted habitat (Table 206) is under consideration for vegetation treatments (Wildlife Report-323). NEPA requires that impacts be disclosed before decisions are made and does not allow best estimates. Furthermore, the Forest can't accurately predict impacts or mitigation if it has no idea where the MSO habitat is. "Changes to MSO habitat structure as a result of these combined actions are expected to be minimal." Ibid. This assertion is based on absolutely nothing. 10,155 acres of protected habitat and 23,800 acres of restricted habitat are both best estimates with no cumulative effects analysis. It is impossible for the Forest to determine that combined actions, which are not fully disclosed, and which have not gone through FWS consultation, could be minimal. "Changes are expected in MSO prey habitat. Decreases would occur in coarse woody debris, logs, and snags. Burn prescriptions and ignition techniques should limit overall losses of logs and snags." Ibid. The 2012 Recovery Plan requires an analysis of short-term impacts to prey species. This analysis can't be conducted because the Forest doesn't even know precisely what habitat will be impacted. "These projects represent polygons omitted from the 4FRI planning effort because planning was already in progress. Treating within these polygons will reduce fire threat for MSO habitat within the respective project polygon as well as reducing the threat of high severity fire starting in these projects and burning habitat outside the polygons. Given the dbh limits employed and the generally low intensity of the treatments, decreases in the risk of high severity fire and improvements to understory vegetation/prey habitat are expected to be short term only." Wildlife Report-424 "Cumulative effects will include local disturbance from noise and potentially additional disturbance from smoke. Individual projects include one on the Williams Ranger District (Bill Williams Mountain) and projects distributed across the Flagstaff District from the San Francisco Peaks to the edge of the Mogollon Rim. Given the various stages of planning or implementation, project effects would be dispersed both spatially and temporally. Given the scale of the 4FRI analysis area (593,211 acres), the amount of MSO habitat within the project area (194,855 acres), and the period of time over which treatments will be implemented (10 or more years), the cumulative effects are expected to be negligible relative to the scale of both time and space within which potential effects would occur." Ibid. Again these assertions are simply guess work with absolutely no empirical data to back them up. The "analysis" as it were is legally indefensible. "Although this alternative would treat PACs using a lower minimum value in PAC habitat relative to the other action alternatives, only 18 PACs are proposed for treatment, so the effect would be limited when averaged across all the remaining PACs." Wildlife Report-243.

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Please document where the Recovery Plan states the FS can average habitat across ALL PACS. Nowhere is this stated or permitted. "If work were completed in 10 years, on average about 8,700 acres of MSO habitat would be mechanically treated and 11,255 acres prescribed burned each year under alternative C." Wildlife Report-242. We find it simply amazing the FS believes it can actually get away with admitting this level of activity in MSO habitat with virtually no analysis of cumulative effects to that habitat. The point of an EIS is to disclose impacts not guess or give estimates of what may happen. The graphs provided on pages 245-246 of the Wildlife Report can't possibly be accurate and at best are guesses or estimates due to the fatal flaws in the opinions rendered. "Mechanically treatments would take place within 18 of the 110 PACs occurring within a ¼ mile of the project area boundary (16 percent) under alternative C. This includes 10,776 acres out of 35,566 total PAC acres in the treatment area (30 percent). Low severity prescribed burning would occur in all 72 PACs within the treatment area. Eighteen PACs would be treated mechanically and 54 PACs would receive burn-only treatments. Although the implementation schedule is not yet known, on average 1.8 PACs would be mechanically treated per year if 4FRI implementation lasted 10 years." Wildlife Report 251. Again, NEPA requires that the "effects" including direct, indirect, and cumulative be disclosed on proposed activities. Simply stating what the activities are and making estimates and guesses about the outcome does not comply with NEPA's requirement to take a "hard look" at project impacts. "The wildlife analysis for the Kaibab forest plan concluded the Kendrick PAC consisted of mixed-conifer habitat. The Kaibab used a mid-scale analysis (100-1,000 acres) for evaluating effects of the proposed land management plan. The 4FRI analysis is based on a finer scale and delineated individual pine stands within the Kendrick PAC." Wildlife Report-252. What is the rationale for each forest using different scales? "Snags greater than 18 inches dbh would remain unchanged and would, on average, be slightly below forest plan direction (Table 77)." "Large snags are currently well below forest plan guidelines in even relatively "natural" areas (Ganey 1999, Waskiewicz et al. 2003)." Wildlife Report-264. Then why is the Forest proposing to log 18" – 24" dbh trees in Alternative C (Wildlife Report-259)? These trees should be left as habitat or for replacement snags particularly if Forest Plan direction is currently being violated. Snags are the most important owl habitat used to provide structure to nesting habitat and also used for roosting. If snags are under Forest Plan guidelines across the forest, that leads to the quality of owl habitat currently without any treatment. The Forest is going to have a difficult time explaining why it is proposing to log the largest diameter trees reducing quality owl habitat when that habitat is currently below threshold values. This is further supported by this statement: "Reduced BA and intermittent openings would increase light, moisture, and nutrient availability for herbaceous understory species. Understory response in threshold habitat is currently low, with biomass index values averaging 14 and 20 lbs/ac in RUs 1 and 3 respectively, and would remain low after treatment (Table 83)." The Wildlife Report speaks to improving MSO habitat in 2050 but fails to analyze the implications of projects now and for the next 37 years, other than to announce guesses and estimates. A threatened species requires far more in depth analysis of proposed projects. "Prescribed burning would occur in all 72 PACs in the treatment area, including 56 core areas (Appendix 14). Prescribed burning would occur on all 35,566 total PAC acres in the treatment area." Wildlife Report – 256. What happens is one of these burns gets out of control? The DEIS is silent on this issue. "Post-treatment modeling indicates that the amount of ponderosa pine forest occurring in FRCC 3 across the general treatment area would decrease to zero in 2020 under alternative C, a reduction of nearly 298,000 acres (Table 78). This change would greatly decrease the risk of high-severity fire moving into protected habitat and increase the potential for managing unplanned ignitions for resource benefits. Combined, this would further decrease the fire risk to MSO habitat. While the risk within nesting and roosting habitat would remain high, the decrease in FRCC 3 across the landscape would help mitigate the threat of losing this habitat to high-severity fire." Wildlife Report 256. We would agree that eliminating 298,000 acres of owl habitat in the next 7 years would reduce the fire threat – it would also reduce owl habitat and owl populations resulting in take in violation of the ESA. Impacts are not analyzed or disclosed. "Mechanical treatments would occur on about 71,603 acres of restricted habitat, or 94 percent of total restricted acres in the treatment area. This includes about 97 percent of the total target and threshold acres. Although the implementation schedule is not yet known, on average 7,344 acres would be treated per year if 4FRI

implementation lasted 10 years. On average, this would equal about 10 percent of the restricted getting treated in a given year. All restricted habitat (100%) would be prescribed burned." Wildlife Report-258. Again, the FS proposes to treat 97% of the total restricted acres and states the implementation schedule is unknown. "Disturbance could occur as a result of project-related activities including moving and operating harvest machinery, hauling forest materials, building fire line, managing prescribed burns, smoke, personnel in the field, and road maintenance and construction. Noise disturbance from project activities may disturb MSO. Alternative C would mechanically treat 82,344 acres of MSO habitat." Wildlife Report-270. "Disturabance" is otherwise known as "take" under the ESA. We fail to see how the FS expects the FWS to consult on this project considering all of the unknowns? If the FS proceeds we request the BO the FWS develops be included as a PDF along with ALL the specialist reports developed for this proposal.

Boggs, Denise

The Implementation Plan states that "[p]rescribed fires are designed to increase tree canopy base height…". DEIS at 611. How would this occur without risking damage to an entire stand? Any fires that burned lower branches of trees and/or burned understory trees, thereby increasing the canopy base height of the post-fire stand, would also be likely to engulf much more of each tree burned. In other words, if one branch was killed by fire, the whole tree might become enflamed, which would in turn ignite at least some of the remaining trees in the stand. This is the very result the project is supposedly designed to prevent or reduce.

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Burning outside the breeding season would help reduce impacts to MSO, as noted at DEIS p. 184. However, there is no analysis of how MSO might be affected by these non-breeding season treatments. This is important because there is considerable evidence that some MSO remain on or near their breeding grounds all year long. FWS, 2012, at 27. Winter detection of MSO is difficult because they do not vocalize at this time of year (ibid), so it is possible that winter occupancy of breeding habitat by MSO is even higher than currently suspected. Research and monitoring must be used to design and implement activities in ways that ensure that wintering owls will not be disturbed.

Boggs, Denise

All activity in PACs needs to undergo consultation with the Fish and Wildlife Service. FWS, 2012, at 274. This is especially the case because much of the project area is critical habitat for MSO; this includes restricted habitat (see subsection C below) as well as PACs. See DEIS Figure 45 at 179.

Boggs, Denise

C. Limit treatment in MSO restricted habitat. Under the Implementation Plan for the action alternatives, even-aged management could be used. DEIS at 612. However, forests used by MSO are typically uneven-aged with complex structure. FWS, 2012, at 25. Even-aged stands by definition have simple structure. MSO would not benefit from silviculturally-created even-aged stands. If restricted habitat in the project area will be manipulated, small even-aged groups could be created, but this should be done over time so that the groups are of different ages, and the overall landscape remains (or becomes) uneven-aged.

Boggs, Denise

Alternative C - Determination of Effects for MSO (taken directly from Wildlife Report 274-276): Alternative C proposes the most treatments in MSO habitat. As a result, more acres of habitat are moved towards desired conditions than under any other alternative. The determination of effects for the Mexican spotted owl habitats is based on design criteria, mitigation, proposed forest plan amendments, the above effects discussion, and the following: • By design, mechanical thinning and low severity prescribed burning within MSO protected habitat would follow

the intent of the MSO Recovery Plan and respective forest plan guidelines as amended; prescribed burning would not occur within or adjacent to PACs during the breeding season • By design, mechanical thinning and low severity prescribed burning within threshold, target, and other restricted habitat would follow MSO Recovery Plan and respective forest plan guidelines as amended • Mechanical thinning in 18 PACs and low severity prescribed burning in 72 PACs, including core areas, may cause short-term displacement to foraging and roosting MSOs outside the breeding season • Improving stand structural and spatial conditions would meet short-term objectives of improving overall forest health and long-term objectives of increased forest resiliency • Fire behavior in protected habitat would be changed in this alternative, with 83 percent of the area supporting surface fire in 2020 and only five percent of the area at risk from active crown fire • About 20 percent of the total road miles in 58 PACs would be decommissioned after treatment activities, lessening the amount of long-term disturbance to MSOs and their prey that is associated with access; road segments in three PACs, including core habitat in one PAC, and in restricted habitats would be relocated to provide long-term protection for ephemeral stream channels and the habitat they support • Fire and smoke effects from prescribed burning may disturb individual birds in and adjacent to the treatment area, but timing restrictions and low severity burn prescriptions would reduce impacts and largely lead to no or only short-term effects; however, the amount of burning across the landscape under this alternative creates the potential of smoke settling into a PAC, potentially leading to adverse effects to individual owls • Post-treatment growth rates of trees would increase, tree resiliency to drought and insects would improve, and more of the total BA would be occurring in larger size classes, improving MSO habitat components in both the short- and long-term • Large snags (greater than 18 inches dbh) are currently below forest plan guidelines; future snag recruitment is expected through existing insect and disease activities and impacts of low severity prescribed burning. Snag development is expected to occur as more trees attain larger size-classes and meet the size-class distribution recommended in the Recovery Plan; snag retention would improve through road decommissioning; over the long-term, snag development and retention is expected to improve after project implementation • Key sites that can support diverse and abundant understory vegetation within MSO habitats would be improved or restored for both the short- and long-term, including about 23 springs, and about 5 miles of ephemeral channels, 3,870 acres of meadows, and 940 acres of aspen. There is a strong link between raptors and their food and conserving and enhancing prey habitat is expected to benefit MSOs (Ganey et al 2011). • The development of 8,412 acres of restricted target and threshold habitats would be managed towards meeting a 110-150 BA for MSO nest and roost habitat as recommended in the draft MSO Recovery Plan (USDI FWS 2011) • Total treatments in MSO habitat include 82,344 acres of mechanical thinning and 112,546 acres of low severity prescribed burning and would provide for understory grass/forb/shrub release to improve habitat components for MSO prey base; improvements would be maximized in the short-term and while improvements would decline, they would be maintained above existing conditions over the long-term; overall this represents the most acres of MSO habitat improved through treatment and hence the largest understory response of any action alternative • Thinning and low severity prescribed fire on 67,378 acres of restricted “other” habitat would provide for “groupy” tree structure and canopy gaps resembling historical conditions at spatial scales capable of reestablishing understory regeneration and reducing risk of active crown fire over both the long- and short-term • Implementing both mechanical and prescribed burn treatments would reduce hazardous fuel loads, reducing the potential for future stand replacing, high severity crown fire and also protecting soil resources by reducing severity of surface fires over both the long- and short-term; however, these benefits would decrease in the short-term without maintenance burning • Alternative C would preserve current old growth habitat and develop old growth components in 100 percent of MSO protected, target, and threshold habitats (45,168 acres) and additional acreage in restricted “other” habitat (see Silviculture report), sustaining key MSO habitat components over the long-term • Forest conditions within the historical range of variability (FRCC 1) would be returned to 19 percent of the landscape by the year 2020, thus reducing the potential for large-scale MSO habitat loss from high-severity fire; while this benefit decreases in the long-term, the amount of area in FRCC 1 remains higher compared to existing conditions, providing both short- and long-term benefits • Forest conditions moderately altered

from the historical range of variability (FRCC 2) would be returned to 78 percent of the landscape by the year 2020, thus reducing the potential for large-scale MSO habitat loss from high-severity fire; while this benefit decreases in the long-term, the amount of area in FRCC 2 remains high in alternative C (similar to alternative B) compared to existing conditions or alternative D, providing both short- and long-term benefits • Alternative C is the only alternative to reduce FRCC 3 to zero in the year 2020 and by 2050 about a third of the ponderosa pine forest (33 percent) would move into FRCC 3, providing the best short- and long-term benefits relative to the historical range of variability This is the only alternative to reduce fire severity within core areas. MSO stratified habitat will provide for a mosaic of desired stand structure conditions, improving habitat heterogeneity and vegetative diversity. This mosaic would allow for a diversity of potential fire effects, thereby increasing opportunities for the maintenance of forest structure and function using planned and unplanned ignitions in the future (up to 30 years). Canopy characteristics and surface fuel loading combine to produce combinations of surface fire intensity and physical structure (the height, density, and horizontal and vertical continuity of canopy fuels) that can produce crown fire under a given set of conditions. The closer conditions are to this threshold, the faster it will deteriorate to a point where crown fire is possible. The changes in protected, target, and threshold habitats in alternative C would maximize future opportunities to manage fire and avoid stand replacing events. Alternative C would provide and sustain long-term nesting and roosting habitat while reducing potential risk of high severity wildland fire and other stochastic events. To mitigate adverse effects associated with treatments within protected habitat, no treatments would occur during the breeding season and no activities would occur within the core area. Unintended smoke from first-entry burns that settled in PACs could adversely affect egg development or nestling survival by flushing the female, or affect nestling development through lung damage. The majority of these conclusions are not substantiated in the CEA and admittedly are estimates and best guesses. What is clear that the FS in its rush to reduce any threat of wildfire, will destroy owl habitat, displace owls and likely take owls. There is absolutely no analysis of the best available science pertaining to owls and fire. Owls evolved with wildfire over millennia. Owls use burned habitat at all levels – high, moderate, and low severity. Owls have actually shown a preference for foraging in high severity burned habitat (Bond 2009).

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The alleged CEA for MSO is fatally flawed and legally indefensible. We strongly encourage the FS to abandon this 4FRI "landscape level" analysis because it is not an analysis – it is simply a compilation of best guesses and estimates of potential impacts.

Treatments in post-fledging family areas (PFAs) in ponderosa pine could result in habitat that is 55 percent interspace (i. e., in permanently non-forested openings between tree groups – see DEIS at 521, 525), with up to 80 feet between tree groups. DEIS Appendix D, Implementation Plan, at p. 628 et seq. Basal area could be as low as 70 square feet per acre (ibid.), and as low as 30 in the pine-sage type (id. at 636). After proposed treatment, Restoration Unit (RU) 3 would be 46 percent open/ or very open, and RU 4 would be 57 percent open or very open. DEIS at 706. With this amount of open areas, it is not clear that PFAs will have canopy cover exceeding 50 percent as recommended by Reynolds et al, 1992, at 14. Reynolds further recommended that one-third of the mid-aged portion of each PFA have at least 60 percent canopy cover, and the remainder at least 50 percent. Id. at 23. It is the mid-aged trees in goshawk habitat that would be targeted for removal under the project because VSS classes 3 and 4 are said to be in abundance. DEIS at 215, 218. Any area that is 55 percent interspace certainly would not have 50 percent canopy cover. Tree groups would be 0.1 to 1.0 acres in most of the treatments within goshawk habitat. PFAs Id. at 629, 632, and 634. This would well-fragment the habitat, as small islands of habitat would be retained in a sea of non-habitat, at least in the treatments with the higher percentage of interspace. Note that Reynolds' direction is to not include natural and permanently created openings in the acreage of the PFA. Reynolds et al, 1992 at 22-23. In other words, some of the proposed treatments would turn existing PFAs into non-PFAs. In lands outside PFAs, up to 70 percent could be interspace in wildland-urban interface (WUI) areas and 55 percent elsewhere, with interspace width up to 120

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feet and 100 feet, respectively. DEIS at 620. The BA would be 50-70 for uneven-aged management and WUI areas. For intermediate thin areas, BA would be 70-90 with up to 55 percent interspace. Id. at 610. This would fragment goshawk habitat, just like in PFAs. In pine-sage, BA would

only be 30-50. Id. at 625.

The Forest Plan amendment allowing the above-described destruction of goshawk habitat (see the amendment at DEIS pp. 520 et seq.) must not be approved. It would allow interspaces as wide as 200 feet. Id. at 525. It would also direct that canopy cover in PFAs only be measured within tree groups, and not in interspaces and areas in VSS 1-3. Id. at 624. That is unacceptable – it would allow a scenario where more than half of the area was in interspace, meaning the canopy cover for the PFA was low, but it would comply with this amendment provision if the cover

Boggs, Denise was high enough within the groups. A relatively high canopy closure (50-60 percent) is needed in PFAs to protect young goshawks from predators. See Reynolds at 23.

VI. THE PROPOSED PROJECT WOULD CREATE HABITAT THAT IS TOO OPEN FOR GOSHAWK. As with MSO, treatments in goshawk habitat

Boggs, Denise designed to significantly reduce the susceptibility to stand-replacement fire would significantly degrade or destroy the habitat. The proposed treatments are too intense and would cause unacceptable degradation of goshawk habitat.

Goshawk habitat occupancy is already declining, especially on the Kaibab National Forest, where monitoring has been more intensive. See Wildlife Report at 97-100. This is the case even though projects after 1996 “have been designed to move the landscape toward the desired conditions for northern goshawks". DEIS at 222. It is thus

Boggs, Denise possible that the large amount of treatment in goshawk habitat would cause further decline in occupancy.

Fires could be used to reduce fuels in goshawk nest stands and PFAs. Id. at 637, 638. A concern expressed above for burning in MSO habitat also applies here: burning in dense stands risks igniting a stand-replacement fire. Another concern previously expressed about burning in MSO habitat applies to goshawk habitat: losing coarse woody debris, which is a critical attribute of PFA habitat. See Reynolds et al, 1992, at 6. Woody debris is to be “[p]resent

Boggs, Denise throughout the PFA” (id. at 23), and the same in the foraging area (id. at 27).

Fire in goshawk habitat could be beneficial if it reduces fine-scale (less than three-inch diameter) surface fuels; however, it could also burn up coarse woody debris, which is an important habitat component. Note that in four of the restoration units, the amount of

Boggs, Denise coarse woody debris in pieces greater than 12 inches in diameter is well below the desired amount. Wildlife Report at 108.

The Wildlife Report states that the Forest Plans allow prescribed burning in PFAs during the breeding season. Id. at 345. However, the Coconino Plan actually states: Limit human activities in or near nest sites and post-fledging family area's (sic) during the breeding season so that goshawk reproductive success is not affected by human activities. Id. at 65-11. An identical provision is in the Kaibab Plan at p. 31. Burning should not be

Boggs, Denise done during the breeding season. Goshawks may have evolved with fire, as stated at p. 345 of the Wildlife Report, but chicks could easily perish, and adults could be forced to abandon nests, if smoke was too thick or lasted too long.

Though past, present and future projects that might affect goshawk are listed in Appendix 12 of the Wildlife Report, there is almost no
Boggs, cumulative impacts analysis of effects from past, current and reasonably foreseeable future projects on goshawk habitat. See DEIS at 222,
Denise Wildlife Report at 357. This is a serious omission in light of the decline in goshawk occupancy discussed above.

VII. PROTECT SOILS. The DEIS (p. 25) states that 85 percent of the soil strata in the project area are in satisfactory condition. Treatments should not be done on those areas (15%) in less than satisfactory conditions. Use of heavy equipment for logging is particularly of concern, since such equipment use can cause compaction and displacement of soils, which would prevent or delay the establishment of herbaceous ground vegetation or regeneration of trees. Under the project design criteria, up to 30 percent of treated areas could have bare soils after five years.
Boggs, DEIS at 673. This is a violation of regional soil standards. The goal should be to revegetate affected areas within two years or less. The longer the
Denise soil remains bare, the more it is subject to erosion from wind and water run-off.

VIII. TREAT SLASH TO REDUCE SPREAD OF IPS BEETLE. DEIS at 684 states that ponderosa pine mortality from ips beetles (likely ips pini, or pine engraver) has increased greatly. It is well known that piling ponderosa pine slash can provide breeding areas for this insect, which then reproduces and attacks and kills or top-kills live pine. With the large amount of mechanical treatment of ponderosa pine proposed, a large amount of slash would be produced. Surface fuels already average about 11 tons per acre. Id. at 25. Significant additions of activity-generated slash could make the total accumulation above the desired range. We do not see a discussion of slash disposal in the DEIS. It seems to be assumed that prescribed fire would sufficiently reduce slash accumulations. However, there is a question of how safe such fires might be, given the dense stands. See id. at 21 and discussion in section V B above. Even if it did not risk causing crown fires, burning slash might burn up desired coarse woody debris, which is an important habitat component for both MSO and goshawk. We further recommend that slash not be piled, or that such piling generally be limited to hand piling. Machine piling can scrape off top soil and, with repeated passes over ground, cause soil compaction or displacement. Burning machine-constructed piles, which usually are large and contain at least some larger (greater than three inch-diameter) material, will sterilize the soil beneath them. Note that Reynolds recommends against machine piling in goshawk nest
Boggs, areas, PFAs, and foraging areas. Reynolds et al, 2002, at 22, 26, and 29, respectively. However, design criterion FE 4, DEIS at 569, indicates that
Denise machine piling and burning might be done under the project.

CONCLUSION. The proposed project needs to be significantly reduced and redesigned. Cutting in MSO and goshawk habitat must be greatly reduced and eliminated in nest core areas. Prescribed fires, especially in MSO and goshawk habitat, must be burned only where and when there is assurance that crown fires will not result, and not during nesting season. A full cumulative impacts analysis on the impacts to MSO and goshawks and their habitat must be presented in the FEIS. No project should be approved unless or until there is a complete monitoring plan (including for impacts to MSO) in place, and sufficient funding to fully carry it out is assured. Additional alternatives, including at least one that describes a much smaller project, must be fully considered in the EIS. Large trees must be retained. Soils must be revegated as soon as possible after
Boggs, treatments. Slash must be treated to avoid breeding ips beetles, but
Denise machine piles should neither be created nor burned. Currently the

	DEIS is legally deficient. It did not rely on the appropriate Recovery Plan for the MSO and in general failed to use the best available science for MSO and Goshawk habitat management, and risk of wildfire. The many Forest Plan amendments are significant under NEPA and require an analysis of their own, because they would dramatically change management direction in the Plan for MSO and Goshawk. They simply can't be a part of this DEIS.	
Boggs, Denise	On behalf of the Conservation Congress and WildEarth Guardians I am submitting the attached DEIS 4FRI comments, a memo insert from WEG, and a copy of WEG's comments on the Draft Recovery Plan for the MSO. Please incorporate these documents into the administrative record and keep us on the mailing list for the FEIS. We also request that all associated specialist reports and USFWS consultation documents be posted on the Coconino website for this project. Hard copies of these three documents were mailed to the Supervisor's office today.	The original letter from Denise Boggs was entered as letter #107. Per request from Denise Boggs, Conservation Congress, letter #115 superseded the May 13, 2013 (Letter #107). Per request received from Denise Boggs on May 28, 2013, all comments and responses are superseded by the March 28, 2013 letter. See letter #137 for all responses.
Boggs, Denise	FW: 4FRI DEIS comments I am including a fourth document to include in the Administrative Record for the 4FRI DEIS. It is a compilation of excerpts from the 2012 MSO Recovery Plan. All four documents were mailed to the Supervisor's office today.	137-1: Thank you. We have indicated that all previous letters are superseded by your comments dated May 28, 2013. In addition to providing responses to this letter, we have also reviewed and provided responses (as warranted) to the attachments.
Boggs, Denise	Please use this version of DEIS comments with contact information included. On behalf of the Conservation Congress and WildEarth Guardians I am submitting the attached DEIS 4FRI comments, a memo insert from WEG, and a copy of WEG's comments on the Draft Recovery Plan for the MSO. Please incorporate these documents into the administrative record and keep us on the mailing list for the FEIS. We also request that all associated specialist reports and USFWS consultation documents be posted on the Coconino website for this project. Hard copies of these three documents were mailed to the Supervisor's office today	(137-2) The final Biological Opinion from the FWS and most specialist reports will be posted on the website. Also see response 137-1.
Boggs, Denise	WildEarth Guardians believes that the 2012 Recovery Plan for the Mexican spotted owl is inadequate in many ways to assure the conservation and recovery of the owl.WildEarth Guardians' concerns regarding the substance of the 2012 Recovery Plan were set out in its August 23, 2011 comments on the draft of that Plan, which comments were submitted to the Fish and Wildlife Service during the period of plan development.See attached.WildEarth Guardians'	(137-3) Issues with the 2012 Revised MSO Recovery Plan developed by the FWS are outside the scope and jurisdiction of this analysis. In response to the comment on the DEIS, a crosswalk demonstrating project compliance with the revised MSO Recovery Plan can be found in appendix 3 of wildlife report. The implementation plan (FEIS, appendix D) has been updated to reflect the revised recovery plan. The wildlife report and the FEIS now include a discussion of how the project

	comments on the Four-Forests Restoration Initiative – and the various ways in which the Initiative fail to adhere to the framework set out in the 2012 Recovery Plan – do not constitute any waiver of WildEarth Guardians' to challenge the substance of that Plan in the future and do not constitute any sort of tacit endorsement of the provisions of that Plan.	transitioned from the 1995 MSO Recovery Plan to the 2012 revised plan.
Boggs, Denise	The number of known owl individuals and owl sites has increased since the MSO was listed as threatened in 1993. However, the FWS has cautioned that this increase in known individuals and sites does not reflect an increase in abundance or an upward population trend. Rather, the increase "is mainly a product of new surveys being completed within previously unsurveyed areas." *** 12RP vi.	(137-4): This is information on the 2012 MSO Recovery Plan regarding species' status. There are no specific management recommendations provided within this comment. No change to the specialist report or FEIS is required.
Boggs, Denise	Success of the Recovery Plan hinges on the commitment and coordination among the Mexican government, U.S. Federal and state land-management organizations, sovereign Indian nations, and the private sector to ensure that the proposed population and habitat monitoring are implemented. 12 RP vii. Without careful and rigorous application of the proposed population monitoring, there would be no objective basis for delisting the owl. 12 RP vii.	137-5: The revised recovery plan for the Mexican spotted owl details a new sampling framework at a scale that is biologically meaningful for the owl. This necessarily crosses large landscapes and land jurisdictions stratified by MSO ecological management units. Biologically meaningful scales for population monitoring require large landscapes that include multiple states and jurisdictions. Implementing a survey design at this scale was beyond the scope of the 4FRI project. An undertaking of this scale has been initiated by the USFS Region 3 Regional Office in cooperation with the Rocky Mountain Bird Observatory. A project scale monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy and reproductive output and changes in key habitat components in selected Protected Activity Centers. PAC monitoring will be stratified by treatment type and includes reference PACs. Monitoring will begin before treatments are implemented and continue after treatments are completed. Monitoring protocol and PAC selection continues to be closely coordinated with the FWS. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E of the FEIS. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane.
Boggs,	Given that the owl is a widespread subspecies with a disjunct and	137-7: The 4FRI analysis assessed the management of the MSO and its

Denise	somewhat fragmented distribution, management of the owl and its habitat must be conducted at the landscape scale.Landscape modeling and analysis are critical in evaluating the distribution of owls and habitats, identifying areas where threats are greatest, and then applying Recovery Plan recommendations in such a way as to sustain and improve owl habitat. 12RP viii.	habitat at a landscape scale. The FWS worked closely with the Forest Service from the very beginning of the project to develop the proposed treatments within MSO habitat, including treatments within PACs. The FWS recommended: 1) the project include treatments that would allow removal of trees larger than nine inches within the PAC, 2) mechanical treatments only occur outside the core areas, 3) target a lower minimum total BA within PACs, and 4) recommended prescribed burning within core areas. Monitoring of these treatment effects was also assumed from the start of project planning. During this time the 1995 MSO Recovery Plan was still in effect. The intent of these recommendations was to improve consistency with the revised recovery plan recommendations that were under development (the draft MSO recovery plan had not yet been completed). Alternative C was developed, in part, to respond to these recommendations (DEIS, page 47). See response to comment 137-5 for MSO monitoring. No change to the wildlife analysis or FEIS is required. Mitigation and monitoring from the FWS BO has been incorporated into the FEIS.
Boggs, Denise	As management proceeds, monitoring assesses the efficacy of management actions. Thus, it is critically important to monitor owl populations and habitat to determine whether both are stable or improving. Monitoring population trends provides a real-time assessment of the owl's status, whereas habitat monitoring allows us to predict if there will be adequate habitat to support a viable owl population in the future. 12RP p. ix.	137-8: The recovery plan states "As a surrogate for evaluating trends in actual owl numbers, owl occupancy will be monitored at a sample of fixed sites randomly selected throughout the U.S. range of the Mexican spotted owl. No specific design is proposed for monitoring habitat, although Forest Inventory and Assessment data might have application to the owl." The monitoring proposed on this page of the revised recovery plan is for range wide monitoring and not at the project level. See the discussion for excerpts 2 and 3 on how the Forest Service is part of the range wide monitoring. See our response to comment #137-5 in regards to project-scale monitoring. Appendix E of the FEIS includes the monitoring plan developed jointly with the FWS.
Boggs, Denise	The Recovery Plan sets forth recommendations for management and monitoring of the Mexican spotted owl and its habitat. Both are key to the eventual recovery of the owl as management proceeds within an adaptive framework whereby monitoring is used to assess the efficacy of management actions. 12RP p.3	137-9: See responses to previous excerpts.
Boggs, Denise	The Recovery Plan promotes a landscape scale approach to implementing owl recovery actions. Landscape modeling and analysis are critical in evaluating the distribution of owls and habitats, identifying areas where threats are greatest, and then applying plan	137-10: See responses to previous excerpts.

	recommendations in such a way as to sustain and improve owl habitat. Pp.3-4	
Boggs, Denise	Juvenile Mexican spotted owls move through a wide variety of habitats during the dispersal period (Ganey and Block 2005b), and many of these habitats differ greatly from typical breeding habitat and have no formal protective measures under the 1995 Recovery Plan or this revision (i.e., they fall under the category of other forest and woodland types). P. 27	137-11: This excerpt is part of the background section of the revised recovery plan. It provides information on juvenile owls and wintering areas. This comment provides no management recommendations.
Boggs, Denise	Low winter detection rates make it difficult to locate migratory or wintering areas, and thus, we are left with no rigorous methods to identify such areas for protection (Ganey and Block 2005a). The types of lowland areas in which wintering owls have been observed cover vast areas, and we presently have no evidence that suitable wintering areas are limiting. Nevertheless, this is a topic on which further research would be valuable. P. 27	137-12: This excerpt is part of the background section of the revised recovery plan. It provides information on juvenile owls and wintering areas. This comment provides no management recommendations.
Boggs, Denise	Mexican spotted owl population trends remain unclear. P. 30	137-13: This excerpt is part of the background section of the revised recovery plan that provides information on population trends. This comment provides no management recommendations. However, as a point of clarification, excerpts #15-18 are from the same paragraph and the remainder of the sentence immediately before excerpt 18 reads as follows: "These considerations suggest that additional research would contribute greatly to our understanding of the owl (see Part V.F.) and that ...(excerpt 18). Part V.F. (page 99) notes that a number of Collaborative Forest Landscape Restoration Projects provide opportunity to overlay research to understand effects of restoration prescriptions on owl populations and habitat (also see response to excerpt 4 for development of treatments with the FWS).
Boggs, Denise	Because these owls are long-lived, population trend studies must be long-term (i.e., at least 10 years). P. 30.	137-14: See responses to previous excerpts, particularly 137-5.
Boggs, Denise	Data on trends in populations or occupancy rates are few, and methods and sample sizes differ among studies, making comparisons difficult. However, results from these study areas have all noted that the study populations have declined in the recent past (Seamans et al. 1999, Stacey and Peery 2002, Gutiérrez et al. 2003). P. 30	137-15: See responses to previous excerpts.
Boggs, Denise	Further, range-wide conclusions cannot be reliably inferred from the limited data available. P. 30.	137-16: See responses to previous excerpts.
Boggs,	[U]nderstanding how the owl responds to environmental variation is	137-17: The biological assessment for the project was submitted to the

Denise	critical to its recovery. Despite concerted efforts to understand the influence of environmental variation on owl vital rates, considerable uncertainty remains. P. 30	FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing habitat components for MSO and their prey that were identified as important for sustaining resident MSOs. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project "may affect but is not likely to adversely affect MSOs and their habitat, or their critical habitat", (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS jeopardy analysis placed an emphasis on consideration of the range-wide survival and recovery needs of MSOs and found the selected alternative will not jeopardize the continued existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat (USDI FWS 2014, page 33). After reviewing the 4FRI and its effects to MSOs and their habitat, the FWS called the project "a remarkable step forward in attempting to restore forest structure, composition, and resiliency..." and that the project had done a good job of including measures to protect MSOs and their habitat (see appendix 2 of the wildlife report). Also see the uncertainty and risk discussion in the "Mexican Spotted Owl" analysis in the "Wildlife" section of chapter 3.
Boggs, Denise	We have learned a great deal about the Mexican spotted owl in the last decade, but significant information gaps remain. P. 31	137-18: See previous responses, particularly 137-5 and 137-17.
Boggs, Denise	Most studies of the owl have been descriptive rather than experimental. P. 31	137-19: This comment provides no management recommendations.
Boggs, Denise	Although we have identified patterns with respect to some aspects of the owl's ecology (e.g., habitat use), cause and effect relationships have not been documented. Much more information is needed on how specific factors alone and in combination affect change in Mexican spotted owl abundance. P. 31	137-20: This comment highlights the importance of monitoring treatments in MSO habitat and the need to coordinate those efforts with the FWS, which is what the 4FRI is doing. See previous responses, especially 137-17.
Boggs, Denise	P. 31 [M]anagement recommendations in the near-term must deal with high levels of uncertainty.	(137-21): The wildlife report, BA (appendix 2 of the wildlife report), and the FEIS all address uncertainty and risk. See response to 137-7 for a summary of how treatments were developed with the FWS. Note that

		excerpts #9 to17 are part of the background section of the revised recovery plan and provide no management recommendations or comments on whether the proposed actions are compliant with the recovery plan. Please note that Part V.F. of the recovery plan (page 99) noted that Collaborative Forest Landscape Restoration Projects provide opportunities to overlay research and better understand effects of restoration prescriptions on owl populations and habitat.
Boggs, Denise	Only two projects resulted in biological opinions that the proposed action would likely jeopardize the continued existence of the Mexican spotted owl: 1) implementation of the Region 3 Forest Plans without adopting the Recovery Plan (an action that was never implemented); p. 33	1(37-22) This is part of the background section of the of the revised recovery plan. It provides information on federal actions affecting the MSO and discloses past federal actions. It does not apply to the forest plans that are relevant to this project; see FEIS, chapter 3, "Consistency with Mexican Spotted Owl Biological Opinions (2012 and 2013).
Boggs, Denise	High-severity burns have the most negative long-term effects on spotted owl nest and roost habitats but could enhance foraging habitats used by owl prey species (e.g., woodrats or deer mice) (Franklin et al. 2000, Kyle and Block 2000). P. 35	(137-23): A stand-alone literature review section was added to the wildlife report addressing fire effect to spotted owls. Also see the response to comment #137-28 below.
Boggs, Denise	They concluded that when relatively large wildland fires burned known nest and roost sites, the fires appeared to have a short-term effect on survival, site fidelity, mate fidelity, and reproductive success (see also Jenness et al. 2004). P. 36	(137-24): This comment does not capture the full findings of fire effects to spotted owls. See fire effects to spotted owl review section in the wildlife report and response to comment #137-28 below.
Boggs, Denise	Furthermore, within 1 km (0.6 mi) of the center of foraging areas, foraging owls selected all severities of burned forest and avoided unburned forest. Further, anecdotal evidence from Mexican spotted owl monitoring suggests that PACs burned with moderate-to-high fire severity continue to be occupied by reproductive owls (S. Hedwall, FWS, pers. obs.; J.P. Ward, Jr, FWS, pers. obs.).	(137:25) The recovery plan considers nest and roost habitat as limiting factors affecting MSO recovery. The 4FRI will improve foraging habitat, but current foraging habitat it is not considered to be limiting MSO recovery. Therefore, preventing the continued loss of nest and roost habitat from high-severity fire was considered important during the 4FRI project development. See also the literature review of fire effects to spotted owls in the wildlife report and the response to comment #137-28 below.
Boggs, Denise	Conversely, owl surveys conducted two years post-wildland fire in some previously occupied, but severely burned areas (e.g., within some areas of the Rodeo-Chedeski Fire on the Mogollon Rim in Arizona), failed to locate Mexican spotted owls (S. Hedwall, FWS, pes. comm.). P. 36	(137-26) This comment provides no management recommendations.
Boggs, Denise	However, despite the variability of fire effects and existing gaps in knowledge regarding short- and long-term effects on habitat and owl responses to wildland fire, we believe that stand- replacing crown fires pose a threat to Mexican spotted owls. P. 36-37	(137-28) Excerpts 19-23 (displayed in comment 137-22 to 137-27) are part of the background section of the of the revised recovery plan. They provide information on reasons for listing the owl under the Endangered Species Act. The excerpt is from the Present or Threatened

Boggs, Denise	The effects of different severities of wildland fire (Question 4 above) on Mexican spotted owls are still poorly understood. P. 99	Destruction, Modification, or Curtailment of the Mexican Spotted Owl's habitat or Range (Factor A). The 4FRI project is designed to reduce the risk of stand-replacing crown fires to MSOs. Modeling indicates that there will be short-term decreases in logs and coarse woody debris, but that the risk of crown fire in PACs will also be reduced (DEIS, p181-184). In addition, numbers of trees in the size-class used for nesting and roosting would increase (DEIS p 134-37) and treatments are designed to maintain large Gambel oak in PACs which are also used for nesting. The recovery plan identifies large pine and oak as key in MSO nesting habitat and deficit on the landscape. Decrease the risk of high-severity fire while improving nesting and roosting are the objectives of PAC treatments in 4FRI. (137-29) The research section of the recovery plan notes that stochastic disturbances and activities like wildfires may not be readily tested with experiments for lack of suitable control (page 99). However, research indicates that a mosaic of burn severities with an interspersion of unburned areas may enhance foraging habitat while maintaining nesting and roosting habitat. There is nothing in the comment to consider in regards to changes to this project.
Boggs, Denise	Although a variety of threats may affect owls within the WUI, our focus is on the effects of intensive fuels reduction treatments on the owl and its habitat. Fuels reduction treatments in the WUI typically aim to reduce tree BA to 30 to 60 sq. ft/ac and change forest structure (e.g., reduce canopy cover by 35 to 75%) to significantly modify fire behavior (USDA, USDI 2001). P. 37	(137-30): The only WUI designated treatment in the 4FRI DEIS is in northern goshwak habitat and not in any designated owl habitat (DEIS, p 72, 84, and 91 for each respective Alternative). Treatments proposed within the DEIS for Mexican spotted owl (MSO) do not have any change in treatment intensity based on its vicinity to private land or other wildland urban interface feature (DEIS, p 71, 83 and 90 for each respective action alternative) as well as the respective maps for each alternative proposed vegetation and proposed fire treatments in Appendix A of the DEIS. The management direction, desired conditions and treatment design for MSO habitat can be found in Appendix D, section A of the DEIS (p 610-617). As you can see from this, there are no WUI type treatments proposed in MSO habitat, only treatments to benefit MSO habitat. The FEIS updates this with the management direction for the revised MSO recovery plan (2012).
Boggs, Denise	On the Lincoln National Forest in New Mexico forest personnel conducted an assessment of fuels treatments needed to ensure community protection, firefighter safety, and ecological functionality in the WUI. The Lincoln National Forest Capability Assessment	(137-31) Comment 137-30 and 137-31 are part of the background section of the of the revised recovery plan. They provide information on Reasons for listing. The excerpt is from the Present or Threatened Destruction, Modification, or Curtailment of the Mexican Spotted Owl's

	evaluated several options, including intensive treatments applied across essentially the entire forest landscape (because most all of the Lincoln National Forest is considered to be WUI), including owl nest stands. This approach could involve significant risk to the Mexican spotted owl population in the Sacramento Mountains. This owl population comprises the bulk of the population in the BRE EMU (Ward et al. 1995). The BRE EMU appears to receive little if any immigration from other populations (Barrowclough et al. 1999), but it may serve as a source population for smaller populations within the region. Thus, implementation of this approach to fuels reduction in the WUI could seriously endanger owls within this EMU. P. 38	habitat or Range (Factor A). The discussion about the evaluation options done for the Lincoln National Forest does not apply to this project. The WUI treatments proposed for this project are outside of MSO habitat in northern goshawk habitat (DEIS, p 72, 84, and 91 for each respective Alternative). Treatments proposed within the DEIS for Mexican spotted owl (MSO) do not have any change in treatment intensity based on its vicinity to private land or other wildland urban interface feature (DEIS, p 71, 83 and 90 for each respective action alternative) as well as the respective maps for each alternative proposed vegetation and proposed fire treatments in Appendix A of the DEIS. The management direction, desired conditions and treatment design for MSO habitat can be found in Appendix D, section A of the DEIS (p 610-617). As you can see from this, there are no WUI type treatments proposed in MSO habitat, only treatments to benefit MSO habitat. The FEIS updates this with the management direction for the revised MSO recovery plan (2012). Mitigation measures recommended by the FWS biological opinion have been incorporated into this project. All mitigation measures for Mexican spotted owl are in the FEIS, appendix C, W1 to W22.
Boggs, Denise	Although we lack direct information relating livestock grazing to spotted owls, we can draw inferences based various pieces of information. P. 42	(137-32): This comment is part of the background section of the revised recovery plan. It provides information on Reasons for listing. The excerpt is from the Present or Threatened Destruction, Modification, or Curtailment of the Mexican Spotted Owl's habitat or Range (Factor A). The 4FRI project does not make a decision on grazing management on either of the two forests. The DEIS contains analysis of the effect to the grazing program from the project (see DEIS, chapter 3, "Range" section) and grazing is discussed as a cumulative effect to the owl (DEIS, page 187-189). The cumulative effects analysis for MSO has been updated in the FEIS (FEIS, chapter 3, "Mexican Spotted Owl Habitat-Cumulative Effects" section, in appendix F and the wildlife report (pp. 366-375).
Boggs, Denise	Seamans et al. (1999) estimated that two populations within the conifer forests of the UGM EMU (formerly RU) were declining at roughly 10% per year, but the causes of the declines were unknown. P. 62	(137-33) This comment is part of the background section of the revised recovery plan. It provides information on Reasons for listing. The excerpt is from Other Natural or Manmade Factors Affecting the Mexican Spotted Owl's Continued Existence (Factor E). The discussion is part of the effects of climate change on reduction in population size. As a point of clarification the paragraph goes on to state that "The owl remains well distributed in the area, suggesting that this estimated

		decline has not been borne out in subsequent years." As noted in the DEIS on page 9 part of the purpose and need of the 4FRI project is to increase forest resiliency. "Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5)."
Boggs, Denise	many owls continue to occupy burned areas, at least in the short term (summarized in Appendix B), p. 73 In USDI FWS (1995), we advocated a population monitoring scheme based on mark-recapture sampling. That design would provide rigorous demographic data on spotted owls as well as estimates of population trend. However, a pilot study conducted to evaluate those methods identified several potential problems. These included high cost and difficulty in finding sufficient numbers of highly qualified field workers. Perhaps more importantly, the mark-recapture approach required capture and banding of large numbers of owls. Although capture techniques for spotted owls are relatively safe, they are not risk-free. Further, many captures likely would be carried out by seasonal field crews, and many of these individuals likely would be inexperienced. As a result, the risk of injury to owls was deemed unacceptable. P. 93 Consequently, we propose a monitoring program based on occupancy monitoring. Such a program will not provide the detailed demographic data that mark-recapture sampling would provide, but it should be safer and cheaper to implement while still providing valid population trend estimates. P. 93 We assume that occupancy rate provides a valid index of population size, although the exact relationship between abundance and occupancy rate remains unknown (Royle and Nichols 2003). Presumably, however, monitoring site-occupancy rates will allow detection of important changes in the owl population. P. 95 Accurate and efficient protocols for monitoring owl occupancy will require pilot studies to estimate occupancy rates and detection probabilities and their statistical variances. These estimates then can be used to determine variables such as the number of plots required and number of call points required per plot, and to evaluate	(137-34): This is a general statement. No detailed response is needed. However, see response to comment 137-43 below for more information.
Boggs, Denise	tradeoffs between greater numbers of visits per plot versus increasing spatial replication by sampling more plots fewer times.	(137-35): See previous responses regarding MSO monitoring and the 4FRI.

Given sample data, all of these factors can be optimized to design a monitoring program that will most efficiently satisfy the quantitative targets in the delisting criterion for population monitoring. P. 96 Despite the considerable interest in and research on the ecology of the Mexican spotted owl, much remains unknown, particularly in Mexico. P. 97 End 2012 RP Excerpts for MSO document

I. INTRODUCTION. The proposed project is a very ambitious scheme for manipulation of vegetation. Almost 600,000 acres would be treated mechanically or with fire, or with a combination of these methods. DEIS at 3. The result would be a considerable reduction in tree density throughout most of the project area, occurring over the project's relatively short implementation time, which would be 10 years, or until objectives are met. DEIS at 40. We do not believe that such a reduction in tree density is necessary or appropriate, especially in such a short time frame. It appears that the Forest Service, in its zeal to restore what it believes is the historical vegetation structure and composition of the landscape, is willing to sacrifice wildlife habitat for a threatened species (Mexican spotted owl –"MSO"), a prominent sensitive species (northern goshawk), and probably many other species. This is not an acceptable trade-off.

Boggs, Denise

(137-36) The 4FRI analysis used the abundance of scientific research related to presettlement conditions. Presettlement conditions are sustainable under a frequent fire regime and would add resilience to the predicted effects of climate change. The science behind the analysis is described in the DEIS on pages 9 through 13, the silviculture report (pages 15-25), the fire ecology report (pages 15-38), and the wildlife report (Appendix 8). While most of the landscape would not equal presettlement conditions after one mechanical entry and 2 fire treatments, the 4FRI would move most treated acres towards presettlement conditions. Both mechanical and prescribed fire treatments were developed based on the needs of both species and their primary prey. owl The management direction, desired conditions and treatment design for MSO habitat can be found in Appendix D, section A of the DEIS (p 610-617). As you can see from this the treatments are designed to benefit MSO habitat and are not the same intensity as non-MSO habitat. The FEIS updates this with the management direction for the revised MSO recovery plan (2012). In response to multiple comments, the FEIS will clarify the relationship of all proposed treatments to the natural range of variability for multiple metrics for southwestern ponderosa pine. Specifically, the silviculture specialist report for the FEIS displays that modeled results for MSO specific treatments for PAC's, Target, and Threshold are either at the upper end of the natural range of variability or outside the natural range of variability for basal area and trees per acre. Restricted habitat is also at the upper end of the natural range of variability, but within the ranges for basal area and trees per acre (FEIS silviculture specialist report, Appendices C-G). MSO and goshawk habitats were analyzed separately from other habitat types. Effects of each proposed treatment were then analyzed in a species-specific manner (see MSO analysis in the wildlife report, pages 173-324, and the northern goshawk analysis, pages 330-357). The trade-offs incorporated into the

planning for this project were, in large part, based on the balance of retaining and improving MSO and northern goshawk habitat. The DEIS on page 181-183, shows all action alternatives would increase trees greater than 18 inches d.b.h in the PAC habitat for the MSO; would decrease tress 12 to 18 inches d.b.h. and increase trees greater than 24 inches d.b.h in restricted habitat; and improve MSO prey based habitat. Pages 218-219, shows that the northern goshawk habitat within all alternatives would move the VSS balance in PFA habitat toward desired conditions and goshawk prey base habitat would be retained or improved across the treatment area. The FEIS includes additional analysis (chapter 2, summary of effects table) for MSO and goshawk to address concerns related to post-treatment openness. In MSO nesting and roosting habitat, there would be no change between alternatives A-E in percent of openness. The percent openness would remain the same as the existing condition. This is because thinning treatments would limit the removal of the overstory structure. In alternative A in MSO restricted (all) habitat, the percent of openness would remain the same as in the existing condition. Existing interspace would continue to be encroached upon by expanding tree crowns and ingrowth. In alternatives B-E there would be little change in the very open to open categories. In restricted habitat, the wider variety of treatments to meet the multiple objectives would decrease the amount of closed conditions by about 54 percent (alt. D). In alternative B, C and E the decrease would range from 52 to 53 percent. In alternative A, the existing condition would persist with 67 percent of the habitat being in the closed category. The decrease in acres of closed conditions is the result of moving these acres into the moderately closed category. This is a result of creating canopy gaps and interspace, although treatments in MSO restricted habitat are relatively conservative. However, closed canopy conditions would remain within tree groups (Wildlife Report, page 214). Treatments would move a significant portion of restricted habitat from closed to moderately-closed canopy conditions. The results would increase MSO prey habitat while developing future nesting and roosting habitat. In addition to increasing the quality of foraging habitat, treatments would decrease the risk of high-severity fire in MSO habitat. A similar analysis with similar results was conducted for goshawk. In addition, closed canopy conditions would be maintained

Boggs, Denise	II. A PROJECT OF THE MAGNITUDE PROPOSED IS NEITHER NEEDED NOR APPROPRIATE. It has long been assumed that nearly all ponderosa pine stands were affected solely by frequent, low-intensity fire, resulting in low-density, widely-spaced stands. However, recent research shows this is not true. While low-intensity fires certainly did occur in this ecological type, there were also mixed- and high-severity fires. One recent study examined the historical fire regimes in four areas, two of which were in Arizona. One of those, the Mogollon Plateau, includes about a third of the project area. The researchers found that historically, 23.1 percent of this area had a mixed-severity fire regime and 14.5 percent had high severity regime. See Williams and Baker, 2012. Thus some parts of the project area historically had dense stands and stand-replacing fires.	on steep slopes, untreated areas, and associated with a range of site-specific habitat features such as other raptor nests, rookeries, around caves and sink holes, and for other specific wildlife needs (see Bridge Habitat appendix to the wildlife report). Other comment letters have pointed out that, based on the best science available, the post-treatment landscape would not resemble presettlement conditions because we not making the forest open enough (see letters from Dewhurst and Ecological Restoration Institute). (137-37) Thank you for your opinion. The silviculture, fire ecology, and wildlife reports all discuss the risk of high-severity fire in addition to discussions of insects, forest diseases, and effects of climate change. Nowhere is it stated that fire is the sole risk to maintaining healthy forests. In regards to Williams and Baker (2012, 2013), the bulk of the science relating to fire regimes in southwestern ponderosa pine does not agree with their results. Fule et al. (in press), questioned the conclusions of Williams and Baker and described how the preponderance of scientific evidence indicates that conservation of dry forest ecosystems in the West and their ecological, social, and economic values is not consistent with a contemporary disturbance regime of large, high severity fires, especially under changing climate. (This paper (Fule et al. in press) has 18 co-authors, the majority of whom are well published in fire ecology). 137-38: Thank you for your opinion. There are over 22 different treatment types in the 4FRI to address site- and species-specific needs (DEIS pages 71-94). The point of this project is to increase the amount of acres treated in an average year. The need to increase the acres treated per year is based on the threat of large-scale, high-severity fires that have become common in the Southwest ponderosa pine forests (DEIS pages 149-161). In addition, secondary mortality factors represented by forest insects and disease are currently at uncharacteristic levels and are expected to increase over time (DEIS pages 139-140 and silviculture report pages 18-22). A landscape-scaled approach to forest health has been recommended in multiple analyses for the Arizona ponderosa pine belt (see the documents referenced in response to comment 1 above and pages 7 and 8 in the DEIS) and is supported by a large and diverse group of collaborators. This collaborative group includes multiple state and federal agencies
Boggs, Denise	Whatever the need or desire to reduce the density of trees in the project area, the proposed project is much too large. Treating almost 590,000 acres of the 988,674-acre project area (DEIS at 3) in as little as 10 years (id. at 40) would adversely affect many resources. Some of the effects, such as how MSO and its habitat would be affected, are not fully known. (See further discussion in section V below.)	

responsible for the natural resources that would be affected by the proposed action. For the MSO specifically, the US Fish and Wildlife Service concluded that a landscape-scaled approach in management was required to ensure the recovery of the MSO in both the original and revised MSO recovery plans (1995 and 2012). The wildlife analysis determined that the project would improve habitat structure in the long term (pages 181-183). The analysis discloses there is likely to be short term, adverse effects as a result of activity-related truck traffic, fire burning out of prescription, and potential noise and smoke disturbance. The analysis is supported by the FWS biological opinion which concurred with the "may adversely affect" effects determination while also summarizing the project as doing a good job of including measures to protect the MSO and its habitat. A more detailed discussion follows: The DEIS states that treatments in alternative C (preferred alternative), “includes recommendations from the U.S. Fish and Wildlife Service (FWS) by increasing prescribed burning treatments within protected Mexican spotted owl (MSO) habitat (to improve the quality of owl roosting and nesting habitat), and aligning treatments in threshold habitat with the “Mexican Spotted Owl Recovery Plan, First Revision” (USDI 2012) (DEIS, page 47). Alternatives B-D included forest plan amendments. In response to comments on the DEIS, an alternative that proposes no forest plan amendments was developed (alternative E). In the FEIS, each resource discloses the effects associated with omitting plan amendments. Additional analysis has been added to the FEIS. A summary in chapter 2 on the environmental consequences for MSO habitat states, “In MSO nesting and roosting habitat, there would be no change between alternatives A-E in percent of openness. The percent openness (degree of heterogeneity) would remain the same as the existing condition. This is because thinning treatments would limit the removal of the overstory structure. In alternative A in MSO restricted (all) habitat, the percent of openness would remain the same as in the existing condition. Existing interspace would continue to be encroached upon by expanding tree crowns and ingrowth. In alternatives B-E there would be little change in the very open to open categories”. In MSO protected habitat, several of the forest metrics are similar across alternatives in 2020 because minimal actions are proposed in PACs. Thinning, (not group selection) is proposed in PACs,

in part to limit affects to overstory structure The percent of SDI max would decrease in all alternatives as a result of the proposed thinning. PACs would still remain in the highest density category ("extremely high density"), although alternative C would move the percent of SDI max to the bottom of this category in 2020, almost achieving a "high density" ranking (high density equals percent SDI max of 55 and lower). The potential decrease in crown fire risk is most prominent in alternative C, and alternative D makes the least change relative to the no action alternative. Implementing two prescribed fires would decrease surface fuel loading and increase canopy base height. The reduction in surface fuel loading would decrease the potential surface fire flame lengths. The higher canopy base height would mean it would take longer flame lengths to initiate crown fire. These two changes decrease the potential of high severity fire effects. Alternative D is the only (action) alternative where at least 30 percent of the habitat would return to FRCC 3, contrary to the purpose and need. A key result of these treatments would be increases in the percent of trees 24 inches d.b.h. and greater. Alternatives B-D would increase the density of this size-class the most. A similar pattern is evident among alternatives for trees in the next largest size-class (18 to 23.9 inches d.b.h.). Growing trees into the largest size-classes takes time and creating more large trees would be an important contribution to nesting and roosting habitat. Decreasing competition around presettlement trees should enhance their survival and overall health and potentially result in more large trees than displayed in the model results. Reducing abundant quantities of mid-sized trees and increasing areas dominated by large trees should improve MSO nesting and roosting habitat (USDI 1995, May and Gutierrez 2002, May et al. 2004, Blakesley et al. 2005). The biological assessment for the project was submitted to the FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing key habitat components for MSO and their prey. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project "may affect and is likely to adversely affect MSOs

and their habitat, including critical habitat", (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS found the selected alternative will not jeopardize the continued existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat (USDI FWS 2014, page 33). In response to comments on the DEIS and to address changes since the DEIS was published, the goshawk analysis was revised and additional analysis has been added to the FEIS. A summary in chapter 2 on the environmental consequences for goshawk includes the following effects: Alternative A would not improve habitat quality, resiliency and sustainability. In all goshawk habitat, no action results in the habitat being at highest risk of increasing densities, increased fire risk, and increased to insect and disease risk. These results are contrary to forest structure, forest health, and resiliency and function desired conditions. Mechanical treatments in alternatives B, C, and-D would improve age-class diversity and move towards more open, uneven-aged conditions. The percent of SDI max would decrease in all action alternatives as a result of the proposed thinning. The percent of SDI max in LOPFA habitat would decrease to the high end of moderate density in alternatives B and C and decrease to high density in alternatives D and E in the short term (2020). All action alternatives would shift or remain in high density by 2050. Primary benefits from these changes in forest structure are that the risks of large scale loss of habitat from disturbances such uncharacteristic fire, bark beetles, and density-related mortality would be reduced. Trees greater than 24 inches d.b.h. in uneven-aged forest structure would increase as a result of these treatments in all alternatives. Alternatives B and C would increase the distribution of this size class to 20 percent of the area by 2020 whereas alternative D would increase to 15 percent, and alternative E would increase to 18 (from an existing distribution of 11 percent). In alternative A increases the percent to 13 by 2020. Trees greater than 24 inches d.b.h. in even-aged forest structure would increase to 4 percent in alternatives B and C; 3 percent in alternative D; 2 percent in alternative E; and not change in alternative A (from an existing level of 1 percent). Alternatives D and E would increase the distribution of trees in the next largest size-class (18 to 23.9 inches

d.b.h.) in uneven-aged condition to 28 percent; alternative C would increase the distribution to 30 percent and would increase to 29 percent in alternative E. In comparison, alternative A decreases the percent in 2020 to 12 percent but increases by 2050 to 27 percent. In even-aged forest structure, this next largest size class would increase to 22 percent in alternatives B and C, increase to 19 percent in alternative D and increase to 18 percent in alternative E, from an existing level of 8 percent. In alternative A, there is an increase of 21 percent by 2050. Growing trees into the largest size-classes takes time and creating more large trees would be an important contribution to prey and foraging habitat. Substantial increases in the average pounds per acre of understory biomass in all action alternatives would improve cover and food for birds and mammals preyed upon by goshawks as well as the invertebrates that are an important food source for goshawk prey. Alternatives B and C would have the most improvement followed by alternatives E, then D. This would also favor conditions conducive to the spread of low severity fire rather than crown fire. Crown fire would have more severe effects to vegetation and soil. Prey habitat would improve as coarse woody debris increases to desired conditions by 2050. In the short term, tons per acre of coarse woody debris would fall below desired in alternatives B, C, and E. Only alternative D would meet desired conditions in the short term (2020). Alternative A, since there are not treatments proposed, would be at the highest risk of increasing densities, increased fire risk, increases to insect and diseases, and increased risks to goshawk LOPFA habitat. In response to feedback and comments received on treating less aggressively and leaving more large trees, in alternatives C and E canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. In the wildlife report that has been prepared for the FEIS, the determination of effect for goshawk for the preferred alternative states, “Implementation of alternative C may impact individuals, but is not likely to cause a trend to federal listing or loss of viability” (Wildlife Report, page 473, FEIS, chapter 3). The DEIS included design features, mitigation measures and the following soil and water BMPs in appendix C, page 565 of DEIS. These features would be implemented (for temporary road construction) to maintain and protect soil productivity, minimize sediment delivery and improve and

protect water quality. The chapter 3 soil and water analysis (DEIS, table 32) and the soils specialist report (pp. 62-92 and attachment 1, page 165) show less than 15 percent soil disturbance would occur (including temporary road construction) under all action alternatives. The alternatives would not exceed the 15 percent soil disturbance threshold that has been identified as maintaining long term soil productivity. Only a few resources have been included in this response. See FEIS, chapter 3; see the following FEIS Volume 1 sections: "Short-term Uses and Long-term Productivity", "Unavoidable Adverse Effects" and Irreversible and Irretrievable Commitments of Resources". In summary, all action alternatives would result in some unavoidable short-term adverse effects on threatened and endangered species and critical habitat, short term adverse effects on candidate species, proposed species and their critical habitat, sensitive species (individuals), water quality (short term), air quality (short term, during prescribed fire activities), and recreation settings and scenery (short term). However, all alternatives include design features, mitigation measures, and best management practices (FEIS appendix B) that would reduce these adverse effects to the extent practicable while still achieving project objectives. Chapter 3 of the DIES and the corresponding specialist reports that are included by reference fully disclose the effects of the proposed actions within the DEIS.

Boggs, Denise

We also note that Restoration Unit 5 is already very open, as 55 percent of this area is rated as having an open/very open canopy, and only 10 percent has a closed canopy. DEIS at 10. But even so, much of this area is still proposed for treatment, including a large area that is shown as being mostly very open/open . Compare map of Proposed Treatments – Alternative C, with DEIS Figure 6, p. 10. A much smaller project should at least be considered. We recommend that any treatments, particularly those in MSO and Goshawk habitat, be implemented on only limited acreages in a few areas at first. Implementation and effects must be rigorously monitored. The data gathered must then be evaluated to assess the severity of impacts to these species, as well as to watershed, soils, recreation, scenery, etc., and adjustments made to design and implementation as needed to decrease adverse impacts before further treatment is done. To the extent that forest structure needs to be restored (per the purpose

(137-39) In the case of RU 5 (see page 5 of the DEIS for a map of restoration units), an examination of figure 31, the referenced treatment map for alternative C (DEIS, page 85) reveals that the much of the RU would not be treated by the 4FRI. About 55 percent of the RU was determined to be in very open or open condition (DEIS, table 3, page 10). Of the areas proposed for treatment, the dominant treatment consists of prescribed fire-only. This was a result of a stand by stand evaluation by the silviculturist who concluded that mechanical treatments were not warranted throughout much of this transition zone into pinyon-juniper habitat. The mechanical treatments scattered across the remaining portions of the RU include a variety of treatment types that were also assigned by evaluating individual stand data. Small projects make up most of the history of forest management in the 4FRI area and it is clear forest health would suffer if we continued with this model. See for instance the Arizona Forest Health Council report,

and need for the project – DEIS at 9), it would be better to accomplish this gradually to avoid the shock to various resources, such as quickly opening up dense stands in goshawk habitat. (See section VI below for further discussion.)

III. COMPREHENSIVE MONITORING MUST BE ASSURED PRIOR TO PROJECT APPROVAL. In a large project such as the one under consideration, impacts from implementation on many resources could occur across a large area. Monitoring is essential to insure that changes are made in implementation and application of mitigation so that impacts do not get out of control. That is, adaptive management is needed. The DEIS states that: Adaptive management refers to a "rigorous approach for learning through deliberately designing and applying management actions as experiments". Id. at 661; citation omitted. Comprehensive and rigorous monitoring is absolutely

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"Statewide Strategy to Restore Arizona's Forests" which reached this conclusion. This report was developed in response to the Rodeo-Chediski Fire (2007) by many of the groups that later evolved into the 4FRI collaboration group, including the Center for Biological Diversity and the Grand Canyon Trust. Much of the ponderosa pine forest in the 4FRI analysis area is currently at risk from density-related mortality (DEIS, page 13). About 90 percent of goshawk post-fledging family areas are even-aged stands dominated by the young and mid-aged forest structural stages with very little representation from the seedling/sapling, mature, or old forest structural stages (DEIS, page 12). Similar conditions dominate MSO habitat (DEIS, page 14). This leaves about 71 percent of the analysis area with a high bark beetle rating and about 1/3 of the area with moderate to heavy infection levels of mistletoe (DEIS, page 18). These combined conditions have left about half of total MSO habitat in the treatment area at risk from some form of crown fire with nearly a third of MSO habitat at risk of active crown fire (DEIS, page 179). Habitat diversity for goshawks and MSO prey species is in a downward trend with ponderosa pine encroachment contributing to aspen and Gambel oak mortalities and reductions in acres of grasslands and savannas and pine-sage habitat (DEIS, pp. 19-21). Maintaining the current forest trajectory, along with the predicted synergistic effects of climate change, leaves the forest vulnerable to large scale stochastic events (e.g., fire, insects, disease, etc.) that could eliminate MSO and goshawk habitat. We do not expect to "shock" MSOs or northern goshawks. As the comment points out later in the document, MSO have high site fidelity even when high-severity fire eliminates portions of closed-canopy forest.

137-40: We agree. Since the DEIS was made available for public comment, the FS worked with the FWS and finalized the MSO monitoring plan, see response 137-5. In addition, a collaboratively developed monitoring and adaptive management plan by the 4FRI stakeholder group and US Forest Service has been completed and has been added to the FEIS as Appendix E. Regarding goshawk, the description on page 672 for method and sampling techniques for the northern goshawk refers to a project between the Kaibab NF and Laboratory for Landscape Ecology and Conservation Biology (Northern Arizona University) for developing a predictive occupancy model based

essential for adaptive management. However, the monitoring plan in DEIS Appendix E is incomplete. Monitoring would have three tiers of priority, but only tier one would be funded with appropriated money. DEIS at 660. The funded monitoring would only cover implementation monitoring, i. e., determining whether project components were carried out. Ibid. The other tiers, and all effectiveness monitoring, would depend at least in part on money from various partners. Ibid. In the tables of monitoring elements that follow, most of the measures do not state the priority. Thus it is not clear that sufficient money will be available for all the monitoring that must be done to assure adaptive management can be applied. For many of the monitoring questions in Table 143, implementation monitoring (pp. 663 et seq.), there are no "monitoring indicators" showing how the question would be answered. Table 144 (pp. 666 et seq.) has no "triggers", i. e., thresholds indicating a possible need for change. Trigger points for monitoring goshawk will not be set until the "monitoring plan [for the Kaibab NF] become available". Id. at 672. We find no mention at all of monitoring goshawk populations or habitat for the Coconino NF. Given the possibly serious adverse impacts to goshawk from the project (see section VI below), this is a critical omission. There is no provision for monitoring effects to MSO. Even with deferral to the Fish and Wildlife Service, this is not acceptable, as is discussed below in section V. In short, the monitoring plan is not sufficient to ensure that needed monitoring will take place as the project is implemented. The project must not be approved before a more solid monitoring plan, with assurances of adequate funding, is in place.

on a parsimonious selection of habitat variables. This has already been completed and as points of clarification it is not part of the Kaibab NF monitoring plan for the revised forest plan and it does not assess actual goshawk occupancy. The Kaibab NF monitoring plan for the revised plan does not have to "become available" before it can be used for 4FRI habitat assessment. This includes occupancy surveys for goshawks will occur across both National Forests. See previous responses on MSO monitoring.

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IV. THE DEIS DOES NOT ANALYZE A SUFFICIENT RANGE OF ALTERNATIVES. In addition to the required no action alternative, the DEIS analyzes three action alternatives – B, C, and D. These alternatives are very similar and produce the same results. All three of the action alternatives have the same design features (DEIS at 63, Appendix C), and the same road mileage (id. at 74). Many other features of the project are identical across these three alternatives. Id. at 95. There is a relatively small difference in the acreage to be mechanically treated . Ibid. This contradicts case law: "Consideration of alternatives which lead to similar results is not sufficient under

137-41 The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). "The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed "(36 CFR 220.5(e)). Reasonable

NEPA". State of California v. Block, 690 F. 2d 753 (9th Cir. 1982). The Forest Service never seriously considered treating a smaller acreage of land, carefully monitoring and analyzing the effects and effectiveness of treatment, and then deciding how to proceed. Such an alternative could have partially met the purpose and need for the project, as described at DEIS p. 9. In designing and implementing projects, agencies have a responsibility under NEPA to examine alternatives that will minimize impacts. See 42 U.S.C. 4321 et seq. The DEIS does not comply with the Council on Environmental Quality Regulations implementing NEPA, which require agencies to "rigorously explore and objectively evaluate all reasonable alternatives. 40 CFR 1502.14(a). It also contradicts case law: an agency may not "disregard alternatives because they do not offer a complete solution to the problem." NRDC v. Morton, 458 F. 2d at 836." Id. at 1154. The Forest Service would add to the problem of NEPA inadequacy by not doing any project-specific NEPA for activities implemented under the overall project described in the DEIS. Part of the introduction to DEIS Appendix D states: The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. DEIS at 601. However, Appendix D consists of check lists for responsible officials to use when implementing projects, and direction for how to implement site-specific projects. It does not disclose impacts from such implementation, nor does it obviate the need for project-specific NEPA. A programmatic EIS like the current one cannot cover all site-specific issues and impacts. Additional NEPA will be needed for at least some of the activity carried out under the larger project.

alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14).The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The project followed the NEPA by publishing a proposed action and holding public meetings to gather input and recommended alternatives. We responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS and a full restoration alternative that was considered but eliminated from detailed study. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. The Agency's procedures for implementing NEPA state, "Under the CEQ regulations, the Agency is required to: Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). No specific number of alternatives is required or prescribed. Develop other reasonable alternatives fully and impartially. Ensure that the range of alternatives does not prematurely foreclose options that might protect, restore, and enhance the environment" (FSH 1909.14, page 31). Alternatives not considered in detail may

include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm (FSH 1909.14.4, page 36). The DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). These 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 display the locations for road, springs and stream treatments (DEIS, pp. 75-76). Examples of site-specific analysis are located in Chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. The wildlife report addresses effects in a species-specific manner, including individual PAC descriptions for each of the 70 PACs proposed for treatment. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, “The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of

treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions" (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601).The site-specificity of the analysis was tested by the 4FRI stakeholder group on May 12, 2013. In response to comments on the DEIS, the stakeholders wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue" (4FRI Stakeholder, 2013 Cara Letter #155). Other examples of using site-specific data to inform the environmental consequences in the DEIS can be found in the resource sections including: (1) vegetation (page 9,

Boggs, Denise	V. TOO MUCH MSO HABITAT WOULD BE TREATED. A. Large trees are very important. The project area is all or mostly in the Upper Gila Mountains Ecological Management Unit (EMU). This EMU has 52% of all known MSO sites in the U. S. FWS, 2012 at 25. Thus protection of this habitat is very important for the survival and recovery of MSO over the short- and long-term. MSO can nest in trees of various sizes, but nests are typically in large trees, with the average size of a nest tree being 24 inches in diameter. FWS, 2012, at 24. The DEIS states that there is a deficit of large trees, i. e., those at least 18 inches in diameter. DEIS at 14, 179. Under the current MSO Recovery Plan , trees at least 16 inches in diameter should contribute at least 50 percent of the basal area (BA). FWS, 2012, at 277. Thus the larger trees should not be cut. Some post-settlement trees 16 inches in diameter and larger should be retained to serve as replacement trees for large pre-settlement trees, some of which may die over the next decade from bark beetle attack. (See DEIS at 684.) The information on size limits of trees that might be cut in MSO habitat is confusing. Trees greater than 24 inches in diameter in pine-oak forests would be retained. Coconino Plan 65-4, DEIS at 451. Trees up to 16 inches in diameter could be cut in 19 PACs under the proposed amendment to the Coconino Plan. DEIS at 447-448. On p. 505, the limit is 18 inches. The implementation Plan for the action alternatives mentions an upper diameter limit for PACs, but it is not specified. Id. at 610. In restricted habitat, trees greater than 24 inches would be retained (id.	table 10, page 34) which discloses methodology used to inform the analysis, (2) soils and watershed (DEIS table 32, pp. 119-125, appendix C,SW 1-SW 37, appendix A, pp. 126-13) which describes the context of disturbance and effects at the 6th HUC watershed and treatment scale, the rationale for BMPs being based on soil strata, (3) fire which discloses fire behavior at specific locations of concern, at the subunits, the restoration unit, landscape scales and specific locations (such as Pulliam Airport, Kachina Village, Perkins Telescope, etc. (DEIS, p. 150), (4) botany tables 6 through 12 and figures 4, 6, 8 and 9 which display the location of individual species and the locations of noxious or invasive weeds on page 15 and appendix B of the report, and, (5) wildlife which describes how individual MSO PAC treatments were identified for treatment in appendix B pp. 443-444 of the DEIS. 137-42: We strongly agree with the large tree comment. The 4FRI has several design features that specifically speak to retaining large trees across the landscape, particularly in MSO habitat. In addition, the 4FRI adopted an old tree retention policy regardless of tree d.b.h., see DEIS and FEIS appendix C (design features) and D (implementation plan). Large trees are important to MSO. Large trees are underrepresented on the landscape, particularly in MSO habitat. Because the 4FRI consultation with the US Fish and Wildlife Service started January 21, 2011, almost 2 years before the release of the revised MSO Recovery Plan, project treatments were originally developed to meet the 1995 Recovery Plan. However, alternative C was specifically developed to be in alignment with the 2012 Revised MSO Recovery Plan. FS data and the review done by the MSO recovery team both concluded there is a shortage of trees 18 inches d.b.h. and larger. Field reviews of selected MSO PACs highlighted the number of existing presettlement pine as well as large oak that are being outcompeted by dense stands of small diameter trees. Small diameter trees typically range from 5 to 12 inches d.b.h. However, in some specific stands large and old trees are being outcompeted by post-settlement trees 16 inches d.b.h. and larger. After multiple field reviews the stands within the 18 PACs were modeled individually to ascertain how best to maximize large trees and enhance tree growth rates. About 1/3 of the stands would achieve these goals by cutting trees 9 inches d.b.h. and smaller. Less than 6 percent of the stands would achieve these goals by thinning trees 16-

at 612) , but ponderosa pine trees up to 18 inches could be cut if they did not meet the old-tree definition and met some other conditions. Id. at 613. The same is true for target habitat. Id. at 614. The Forest Service needs to simplify and clarify what sizes of trees can be cut and where, especially in MSO habitat. We recommend that trees over 14 inches be retained, and that no trees over 16 inches be cut.

17.9 inches d.b.h. (see pp. 247-254 of the wildlife specialist report). All treatments in PACs were developed to improve MSO habitat as defined in the MSO Recovery Plan. No other objectives influenced the design and intensity of mechanical treatments in MSO habitat. Noting headers within the document should help the reader track what they are reviewing. For example, the reference to 24 inch d.b.h. (DEIS page 451) is a table with the column header identifying it as current Coconino NF Forest Plan Direction whereas the column header for the 16 inch d.b.h. value (referenced on page 447) is Proposed New Standard or Guideline Language. The caption for this table, found at the start of the table on page 444, identifies it as amendments for alternative B. Similarly, the 18 inch d.b.h. limit cited from page 505 is also in a column labeled "Proposed New Standard or Guideline Language" and the caption for this table (on page 502) identifies it as “Alternative C.” Please note that the document follows technical writing convention by including an explanatory caption at the start of (i.e., “above”) every table to help track what the table values represent. Similarly, there is an explanatory caption below every figure. The proposed forest plan amendment references “an upper limit” for PACs because that limit varies by PAC and individual stands within PACs. It is difficult to simplify ecosystem restoration at large scales while retaining site specificity. An easier way to understand what can be cut where, especially in MSO habitat, is to focus on the alternative descriptions rather than the various topics covered in the appendices. An overview of alternative C (the preferred amendment) starts on page 79 under the heading “Alternative C (preferred alternative)". The analysis of project effects to wildlife begins on page 173 with the header “Terrestrial and Semiaquatic Wildlife and Plants” in Chapter 3 (a.k.a. “Affected Environment and Environmental Consequences”). The MSO analysis begins on page 178 with the header “Mexican Spotted Owl (MSO).” The wildlife report describes the alternatives on pp. 153-159 with wildlife design features on pp. 159-172, including a specific header “Vegetation Design Features Common to All Treatment Types Within MSO Habitat” (pp. 160- 162). The wildlife report analyzes the actions and effects in detail by alternative on pp. 188-324.The FS and the 4FRI collaborative spent considerable time discussing tree d.b.h. diameter caps. Diameter caps were used for treatments within MSO habitat because the Recovery Plan describes

Boggs, Denise	B. Too much acreage within MSO protected activity centers would be treated. The DEIS states that MSO habitat is at risk because of mortality risk from high tree density. DEIS at 179. However, recent research shows that at least northern and California spotted owls can survive and use habitat post-fire. See Bond et al, 2002, 2009. Some anecdotal evidence shows that MSO continue to occupy areas that	habitat objectives in that manner. Outside of MSO habitat the 4FRI adopted both large and old tree retention policies. These came from a consensus reached by a collaborative group representing agency, academic, and NGO groups. Treatments would focus on trees less than 16 inch dbh, excluding areas within a series of defined, site-specific exceptions. The intent of this large tree retention strategy was incorporated into the preferred alternative as part of the design criteria (see DEIS, pp. 58-69). The related old tree retention strategy was also incorporated into alternative design and all old trees, regardless of dbh size, would be retained. Over 80 percent of trees in the project area currently range from 5 to 18 inches d.b.h. (silviculture report page 27). Trees <5 inches d.b.h. make up about 2 percent of existing trees; less than 18 percent of trees are >18 inches d.b.h. The former is key for future tree recruitment and the latter is important for many wildlife species. The contiguous canopy has suppressed the understory. Restoration cannot be achieved without thinning trees to open the canopy. That leaves the focus on removing a subset of the trees >5 inches and <18 inches d.b.h. Retaining trees 14 inches d.b.h. and greater would force managers to retain young trees that would not have survived under characteristic fire return intervals. The artificially dense forests would remain stressed from within stand competition among trees. Grassland and meadow restoration would not achievable because of an artificial designation and many species listed as sensitive are grassland obligates (wildlife report page 59). Low intensity fires would be difficult to maintain, forcing the repetition of fire exclusion. Applying an across-the-board arbitrary diameter cap of 14 or 16 inches d.b.h. would preclude the stated objectives of achieving or moving the forest towards sustainable conditions, particularly in light of predicted climate change. A 16-inch diameter cap alternative was considered in the DEIS (p58-59) but eliminated from full study because it would not meet the projects purpose and need as outlined on p 8-29 of the DEIS. 137-43: Addressing the "too much acreage" comment is difficult without having any quantitative values to evaluate. This project did not start with a goal or target number of acres. In terms of MSO PAC habitat, we began by assessing current habitat conditions, research and monitoring records, and reviewed the personal knowledge of biologists from both National Forests and the FWS (see pp. 38-39 of the wildlife

burned at moderate or high severity. FWS, 2012, at 36. This does not mean that stand-replacement fire poses no threat to MSO habitat, but it does suggest that the effects of fire may not be as bad as previously suspected, and that less treatment in protected activity centers (PACs) is needed than is proposed.

specialist report). The group concluded 99 of 117 PACs were in satisfactory condition and 18 PACs were candidates for mechanical treatment. Field reviews of 15 of the 18 PACs proposed for treatment confirmed that conditions could be improved for MSOs by limited mechanical treatments. “PAC treatments” are a unique treatment type developed specifically for MSO protected habitat. The treatments are light (see pp. 247-254 in the wildlife specialist report) and created to match individual stand conditions. Treatments are expected to help maintain current forest components important to MSOs and their prey while decreasing the time it takes to develop future habitat components (see pp. 247-258 in the wildlife specialist report). The number of acres proposed for treatment in PACs was a result of this rigorous process. While data on the effects of moderate or high severity fire on MSOs is limited and unclear, and while much of MSO habitat would retain an elevated mortality risk from high-severity fire (see fire ecology report), reducing fire risk was not an objective or a reason for treating within PACs. Mechanical treatments within PACs would be conducted to improve tree vigor and health. The current Coconino NF forest plan only allows mechanical treatments for removing firewood and reducing fire risk. Because the treatments were designed to improve MSO habitat, they required a forest plan amendment (included as part of amendment 1). Table 24 in the DEIS identifies mechanical treatments as designed to create canopy gaps and reduce fire risk. This will be corrected in the FEIS. While canopy gaps would be created, the reduction in fire risk was an artifact of the treatment, not the objective of it. Treatments in PACs were designed to be so light (see the wildlife report for changes in MSO forest metrics) that the decrease in fire risk was not expected and was not identified until after the treatments were developed and model runs completed for both silviculture and fire effects. In response to Bond et al., they observed that results from previous studies of wildfire impacts on spotted owls have been “equivocal” (2002). In some cases, large stand-replacing wildfires appeared to have a negative impact on owl occupancy, including published reports of likely owl mortalities as a result of unplanned ignitions. Other reports have suggested that low- to moderate-severity wildfires did not adversely impact spotted owls. The authors report on short-term (1 year) effects of fires with mixed-results on owl habitat.

Boggs, Denise	MSO habitat is typically dense, with high canopy closure. FWS, 2012, at 25. Thus this habitat will always be at least somewhat susceptible to stand replacement fire. To significantly reduce the fire threat, the tree density and canopy closure would have to be greatly reduced,	They state 3 of 21 owls (14%) were never resighted after the fires, despite the high site fidelity associated with these birds. Three of 7 pairs failed to reproduce the following year, even though spotted owls are synchronous breeders. Under the Endangered Species Act, effects are measured by individual animals, so these are significant effects. Bond et al. 2009 looked at 4 owl territories. All 4 territories were in mixed-conifer forest in the Sierra Nevada mountains. The territories included low-severity and moderate-severity fire along with unburned areas. This is more in line with the proposed 4FRI treatments and very different from the documented high severity fire in dry ponderosa pine forest in Arizona. Bond et al. (2009) concluded spotted owls selected low-severity burned forest and avoided moderate- and high-severity burned areas for roosting [n=60]; unburned forest was used in proportion to its availability. These results again support the objectives of prescribed fire treatments proposed in MSO habitat under the 4FRI. In summary, it is unclear what information from the references provided is at odds with the proposed treatments under the 4FRI. As stated above, treatments in PAC were not intended to lower fire risk, although the subsequent modeling indicates that they do. Instead, the objective is to improve spotted owl habitat (modeling indicates that this would happen) and increase the ability to retain and produce large trees over time (modeling indicates that this would happen too). Finally, aside from the discussion of California spotted owls nesting in mixed conifer forest in the Sierra Nevada mountains, the 2012 recovery plan for the Mexican spotted owl (page 197) stated: the amount of habitat affected by high severity burns [from 1995 to 2008] was not offset by restored or newly developed habitat …[and] …data suggest that under climate-warming forecasts and less-conservative rates of high-severity fire effects, Mexican spotted owl habitat degradation could escalate in most portions of the range in the foreseeable future." Note that the recovery plan and the 4FRI are specific to Mexican spotted owls, not California spotted owls, and that the data used in the recovery plan did not include 2011, the worst fire year in Arizona history. 137-44: To "significantly reduce fire threat" in MSO habitat was never an objective. Most of the change in fire behavior within PACs would be a result of prescribed fire and not the proposed mechanical treatments. Prescribed fire would reduce surface fuels, primarily focusing on

	which would in turn degrade or destroy the habitat value for MSO.	needles and duff, and raise the crown base height. This combination would reduce the threat of future surface fires transitioning into crown fire. It would also enhance understory conditions by releasing herbaceous species from the physical and chemical inhibition factors associated with accumulated needle duff (see appendix 8 of the wildlife report for the DEIS/appendix 6 for the final). Increasing understory response would benefit MSO prey species and increasing canopy base height would increase sub-canopy flight space for foraging MSO. The fact that this is primarily due to prescribed fire will be more clearly explained in the final EIS. In the FEIS summary of effects table (chapter 2), we have added fire risk metrics for MSO habitat. The analysis found in MSO protected habitat, the potential decrease in crown fire risk is most prominent in alternative C and alternative D makes the least change relative to the no action alternative. The change in active crown fire risk is primarily a result of two prescribed fire entries. Prescribed fire would decrease litter and increase canopy base height. Combined these actions would reduce surface fire flame length and increase the height fire would have to transition from surface into crown fire (i.e., high-severity fire).
Boggs, Denise	Under preferred alternative C, 18 of 72 occupied MSO PACs would be treated. DEIS at 81, 178. In the Knob Creek PAC, mechanical treatment is recommended, including in the nest core. WR at 518. Forest Plan amendments would be needed to allow this. These significant amendments should be analyzed in a separate EIS in order to comply with NEPA. These amendments would remove the limit on cutting in PACs, and also remove the requirement that an equal amount of untreated PACs be established as controls. Id. at 41; see also id. at 448. Specifically, timber harvest would be allowed for "habitat structural improvement". Id. at 446.	137-45: The sentence regarding mechanical treatment in the Knob Creek nest core is in Appendix 2 of the wildlife specialist report. Paragraph 2 under the Appendix 2 header explains that "The following represent notes and photographs from the field reviews." To evaluate the proposed alternatives see "Description of Alternatives" on page 153 of the wildlife report. Environmental consequences of the proposed treatments are described in the "Environmental Consequences" section of the report starting on page 173. Within that section is the header "Mexican Spotted Owls (Threatened)" and within that is the subsection Alternative C where proposed treatments are identified and effects evaluated. While conditions in the core area of the Knob Creek PAC could be improved by mechanical treatments, this was only a recommendation during the field review. The 4FRI team decided not to use mechanical treatments within core areas. Because there is no mechanical treatment proposed in core areas, no analysis was done on this type of treatment. The DEIS disclosed that all of the proposed plan amendments were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance

analysis for each amendment was included in the DEIS and is displayed in appendix B (DEIS p439-564).In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51). With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The

language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in appendix B in the FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C): Amendment 1: The amendment would affect 6,906acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each

Boggs, Denise	However, the 2012 Recovery Plan states: For each planned treatment(s) [in PACs], monitoring should be designed to robustly contrast a set of reference PACs (with no planned treatments) to a set of treatment PACs. … Reference PACs should match the environmental conditions in PACs where treatments are planned, as closely as possible. FWS, 2012 at 282. There is no indication in the DEIS that any such controls would be established, or that the required monitoring would take place. Appendix E, for example, has no measures for monitoring MSO. Existing monitoring is highly variable, as some PACs never or seldom get monitored. DEIS at 178. The DEIS states that the Forest Service will defer to the Fish and Wildlife Service's biological opinion for the project. Id. at 439, 457. While that BO will finalize the requirements for monitoring, it is not acceptable for the DEIS to say nothing about monitoring. The action agency, which in this case is the USFS, must include a monitoring plan for the MSO or else it is in violation of the ESA. Monitoring is critically important for reducing impacts to species like MSO. (See discussion in section III above.) The Forest Service should provide at least an outline and some details of what might be monitored, and how, and what monitoring results might trigger a change in project implementation. Given the importance of this issue, the public deserves an opportunity to comment prior to project approval. Note that the Recovery Plan states that the effects of silvicultural and fire treatments on owl PAC habitat is not fully known, and that monitoring can provide valuable information on the effects on owls and their habitat. FWS, 2012, at 282. Id. at 262 states: Monitoring must be designed and implemented to evaluate effects of treatments on owls and retention of or movement towards desired conditions. Allowing the public to comment on some aspects of monitoring could help improve the final monitoring scheme. Conversely, providing no details on monitoring until after the	amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. 137-46: In appendix B of the DEIS, the public was advised that all MSO monitoring would be developed with the FWS and be based on the biological opinion for this project. ESA does not require projects to automatically have a monitoring plan, and no violations of the ESA occurred. Since the DEIS was available for comment, a robust monitoring plan has been developed and has been made part of the FEIS in appendix E, the adaptive management and monitoring plan. See our response 137-5 for monitoring plan information. In regards to comments on a DEIS, an agency may: (1) Modify alternatives including the proposed action, (2) Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan. As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the "Adaptive Management" section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in how the plan questions and indicators are organized and change section name to "Monitoring:

	comment period closes leaves the public in the dark and does not inspire confidence that project implementation will be changed if needed to protect MSO habitat. Thus it is not clear that the proposed plan amendments and the proposed projects implemented under them would comply with the current Recovery Plan.	Desired Conditions, Indicators, Thresholds and Triggers", (6) Modified the "Monitoring Prioritization" section to reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and change section name to "Prioritization – Monitoring Tiers"; and (7) Modified the "Monitoring Scale" section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix E) informed people that the monitoring plan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species" section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation" section) and the development of the implementation plan (appendix D).
Boggs, Denise	The total amount of land to be mechanically treated in these 18 PACs would be 10,741 acres. DEIS at 83. These averages out to approximately 597 acres per PAC treated. Note that the minimum size for a PAC is 600 acres, FWS, 2012, at 258, 260; Coconino Forest Plan at 65-1. In other words, almost all the acreage in minimum-sized PACs would be treated. This would not even allow the 100-acre core areas around known nest or roost sites to be left untreated, as called for in DEIS Appendix D (DEIS at 610). The EIS should provide more information on the individual PACs, particularly the size of each territory including the amount of nesting, roosting, foraging, and dispersal habitat. Unless all are significantly above minimum habitat thresholds, far too much area within each territory would be cut under the proposed action.	137-47: The assumptions used in this comment are not accurate. The comment presents a calculated average and then uses the average in lieu of specific values. PAC sizes range from 557 to 1,192 ac within the 4FRI treatment area (average for 99 PACs = 689 ac). Core areas range from 99 acres to 173 acres (average = 113 ac). However, core areas are exempted from mechanical treatment as described in table 1 and page 610 of the DEIS and, for Alt C, pp. 38, 153, 160, 243, 253, 254, 265, 266, 267, 271 in the wildlife specialist report (analogous references can be found for alternatives B and D as well). More important than commenting on incorrect averages is the treatment effect and why the treatment is proposed. As described in both the DEIS and the wildlife report, PACs proposed for mechanical treatment, including core areas, were reviewed on the ground (appendix 2 of the wildlife specialist report). Acres within PACs proposed for mechanical treatment were modeled on a stand-by-stand basis to determine: (1) whether treatments were warranted, and (2) what level of thinning would produce the best results using evaluation criteria from the MSO Recovery Plan. About 1/3 of the stands proposed for treatment would adhere to the 9 inch d.b.h. limit that has since been dropped from the revised recovery plan. This was because treating only small trees would achieve the limited objectives proposed in PAC habitat.

Boggs, Denise	The existing basal area (BA) in MSO protected habitat is 155 square feet per acre. DEIS at 14. The desired BA is 150. Id. at 610. It should not require treatment on as nearly as many acres in PACs as is proposed to reach the desired BA. MSO nesting and roosting habitat is naturally dense and should remain that way, so no treatment is needed. However, the minimum BA in PACs under preferred alternative C would be only 110. Id. at 610.	137-48: The fact that the existing BA of 155 is near the desired minimum value of 150 BA only applies to alternatives B and D (and now E). The current BA has nothing to do with determining the number of acres proposed for treatment. Mechanical thinning is proposed for 18 PACs and the degree of thinning varies widely, depending on the individual stand structure of which BA is one variable; it was not determined by evaluating only the overall average BA for protected habitat. No mechanical treatments would occur in any core areas where most nesting is expected to occur (see above comment regarding Knob Creek PAC). Providing for nesting and roosting using the 110 BA is discussed in the revised Recovery Plan. The 150 BA was based on a mistaken use of stand values in the original recovery plan (see page 284 in the revised recovery plan for the full explanation).
Boggs, Denise	That is not a very dense stand at all. To achieve BA of 110 would only require 110 trees per acre that were 13.54 inches in diameter . If such trees were evenly spaced, their trunks would be almost 20 feet apart. The Implementation Plan and project design criteria should require maintenance of a considerably higher basal area for each PAC.	137-49: The 110 BA value is from the MSO Revised Recovery Plan (USDI FWS 2012) and demonstrates alignment with the revised plan. The example of trees 13.54”d.b.h. is not a valid assumption for silviculture and stand dynamics. The MSO recovery team explained the difference between clumps of trees with BA of 150 or greater and overall stands with 150 BA or greater (see page 284 of the revised recovery plan). In the former, a stand BA of 110 will support variability within it so that nest/roost tree groups will still meet or exceed 150 BA. A stand average of 150 BA will maintain unsustainable forest health conditions (see silviculture report for a discussion of percent of maximum stand density index and tree growth and resilience). The goal of treatments is to increase the proportion of trees >24 inches d.b.h. In terms of BA values for individual PACs, page 247 of the wildlife report describes the clarification made in the revised Recovery Plan between stand BA and dense groups of trees within stands. The hypothetical situation described in this comment that was intended to illustrate why 110 BA is too low does not fit the desired conditions expressed in both the DEIS and the wildlife report. The wildlife report states that dense conditions are the objective in PACs, as are uneven-aged conditions. The implementation guide clearly states that 110 is a minimum target and the range from 110 – 150 is acceptable (DEIS, page 610).
Boggs, Denise	All types of MSO habitat in the project area are deficient in snags. DEIS Table 7, p. 14. Logging could remove existing snags and/or trees that will become future snags. Snags and dying trees are typically cut	137-50: Modeled treatments indicate little change in snags numbers before and after implementation (see DEIS, wildlife report, table 77, page 255, and tables 83, 84, and 85 on pp. 265-267). The MSO

in logging operations for safety reasons.

The proposed treatment in PACs violates the latest MSO Recovery Plan: Treatments should be located strategically and informed by fire behavior modeling across the greater landscape. Results of such modeling will allow managers to optimize placement of treatments, thus ensuring maximum reduction in risk of severe fires while simultaneously minimizing area treated in PACs. FWS, 2012, at 258.

Boggs, Denise

The Recovery Plan also states to emphasize treatments outside PACs. Id. at 288.

Boggs, Denise

We are also concerned about the use of (supposed) low-severity fire in all 72 MSO PACs, outside of core areas. See DEIS at 40, 611. According to DEIS p. 184, even core areas could be burned outside

Recovery Plan makes no quantified recommendation for snags; and, snag levels are frequently below forest plan recommendations. Research on this landscape suggests snag availability may be similar to what occurred here naturally (see pp. 81 and 264 in the (DEIS) wildlife report). The main point of treatments in protected, target, and threshold habitats is to retain large trees and increase growth rates to increase the large tree component sooner while retaining existing snags and logs. While some loss is inevitable, particularly with prescribed fire, the MSO Recovery Plan states that providing for large trees through time should also provide for large snags and logs through time. The DEIS displays the largest increase in snags would occur under alternative C. Along with design features to retain dead top and lightning struck trees and all Gambel oak, we expect to retain snag habitat over time for MSOs and their prey (see table 42, pp. 162-172 in the DEIS wildlife report). Snag protection is outlined in the DEIS in Appendix C Design Features and Mitigations in specific design features W1 (p 591) W32, W33, W34 (p 595), W35 (p595), W41 (p597) and W48 (p598).

137-51: Treatments are not inconsistent with the 2012 revised MSO Recovery Plan. MSO "PAC treatments" in the revised recovery plan refers to mechanical treatments. PAC treatments were designed to improve MSO habitat, not to decrease risk of crown fire (pp. 38 and 247 in the (DEIS) wildlife report). The mechanical treatments alone are not expected to change the risk of crown fire by very much. The decrease in surface fuels and raising canopy base height by prescribed burning would decrease the risk of surface fire transitioning into crown fire in PACs. Despite this change in potential fire behavior, areas where PACs occur in groups would remain vulnerable to crown fire (DEIS fire ecology report page165; and, compare figures 40 and 54). Emphasizing treatments outside of PACs is a fundamental aspect of the 4FRI. Locating treatments strategically suggests minimal treatments. The 4FRI would restore or move much of the landscape towards restoration rather than selecting strategic portions of it. Areas southwest of and adjacent to PACs were specifically reviewed for opportunities to further reduce fire hazard inside of PACs (page 35 of the (DEIS) wildlife report).

137-52: While there is always some risk associated with fire, it was decided that using prescribed fire under conditions that would produce very low severity effects was safer than allowing uncharacteristic fuel

the March 1 to August 31 breeding season. This is further confirmed by a summary of the proposed forest plan amendments, which would allow prescribed burning in 56 core areas on the Coconino National Forest. Id. at 81, 439. Under the proposed action, 112,546 acres of MSO habitat would be burned. Ibid. This is 100 percent of MSO habitat in the analysis area. See id. at 123. The Recovery Plan does allow "light burning of surface and low-lying fuels" during the non-breeding season (FWS, 2012, at 261-262). However, if the current condition of forested MSO habitat in the project area is overly dense, as described throughout the DEIS (e. g., at 14), how could fire safely be used in PACs (where the density is likely high), especially in ones that were not first mechanically treated? The DEIS discusses the difficulties and dangers of burning, noting that a high-intensity surface fire could cause a crown fire with extensive mortality (id. at 21), and that it would be difficult and expensive to burn in PACs (id. at 501). Fires, especially those that were not low in intensity, could also burn up coarse woody debris, making it difficult to meet the desired condition for that important element of MSO habitat. (See DEIS at 611, FWS, 2011 at 261.)

loads to continue to increase. Using prescribed fire within core areas also alleviates the need to build the necessary fire line in some of the most sensitive MSO habitat if core areas were to be excluded from fire. Prescribed fire would benefit owls and general forest health in many ways: reducing, not eliminating, surface fuels and raising the crown base height would decrease the risk of large-scale high-severity fire. The subsequent nutrient pulse and reduction in needles and duff benefits herbaceous plants and the associated arthropod community, thereby improving foraging habitat for a variety of MSO, goshawk, and other predator's prey species (see appendix 8 of the (DEIS) wildlife report). Decreasing the ponderosa pine input and increasing the herbaceous input into the soils changes soil chemistry, benefiting soil microbes and fungi and improving overall forest health (appendix 8 of the (DEIS) wildlife report). Seedling/sapling and any small tree mortality reduces density-dependent tree mortality, aiding the continued growth and enhanced resiliency of large pine and oak trees, as well as removing potential ladder fuels which can initiate crown fire. Snag creation helps offset snag loss in the short-term and contributes to the log component. When comparing these and other benefits to the risk of allowing uncharacteristic fuel loads to continue increasing, the FS and the FWS decided to carefully implement the prescribed fire treatments. Even if all the PACs and core areas are burned over the life of this project, they would not all be burned at once. Post burn monitoring and adaptive management will be a part of the process to ensure we understand the effects and, can adjust our methods if necessary. We agree that high intensity surface fire could cause a crown fire, and/or extensive mortality even without crown fire. We also agree that high-severity fire could be detrimental to MSOs (see responses above to comments regarding forest fire and spotted owls). Carefully choosing the conditions under which a prescribed burn would be implemented allows fire managers to produce the desired fire behavior and effects while minimizing the actual loss of MSO habitat. Such conditions may include burning when temperatures are cooler, burning at night, burning when soil moisture/duff is high, burning with higher humidity's, high fuel moistures, using ignition techniques that minimize flame length or residence time, etc. We agree that is more difficult and more expensive to burn in PACs, particularly core areas, because the

Boggs, Denise	The Implementation Plan states that "[p]rescribed fires are designed to increase tree canopy base height…". DEIS at 611. How would this occur without risking damage to an entire stand? Any fires that burned lower branches of trees and/or burned understory trees, thereby increasing the canopy base height of the post-fire stand, would also be likely to engulf much more of each tree burned. In	conditions under which the desired fire effects could be achieved are much narrower than for the rest of the forest. Additionally, the way burn units are laid out combined with the desired fire effects means it takes longer to get a unit burned if it contains a PAC. However, it is certainly possible to burn PACs and core areas safely while producing the desired fire effects. Fire managers from the Coconino and Kaibab NF were involved in discussions about what they could and could not do during implementation. The group, comprised of wildlife biologists, fire ecologists, and fire professionals concluded prescribed fire is an appropriate tool to move MSO habitat (PACs and core areas) towards desired conditions. This conclusion is supported by the revised recovery plan. Fires will always burn up some coarse woody debris (CWD), but they also can create snags and logs (Horton and Mannan 1988, Fulé and Laoughlin 2007, Roccaforte et al. 2009). Some studies have shown an increase in CWD following prescribed fires (Waltz et al. 2003, Keifer et al. 2006). It is likely that the disruption of surface fires has resulted in a more continuous distribution of forest fuels than occurred under the historic disturbance regimes (Ganey and Vojta 2010). However, the low severity fires that would be applied to MSO PACs when conditions are safer for burning are expected to burn in a mosaic, with some areas not burning at all. This would result in improvements to prey habitat by creating heterogeneity in the understory vegetation. Burn objectives would including minimizing CWD consumption and can be managed by burning when fuel moistures are high or under other conditions described above that would inhibit consumption. We do agree that there is always a risk associated with managing prescribed fire in dense forest conditions. This risk was discussed at length with the USFWS and it was decided to proceed with more treatments because of the risk of landscape-scaled, high-severity fire. The discussions are reflected in the Biological Assessment and Biological Opinion, both of which are presented in Appendix 2 of the final wildlife report. 137-53: Thank you for your inquiry. Needles closer to the ground would be scorched by the heat of a prescribed fire. They will fall off within a couple of years, increasing the distance from surface fuels to the canopy, and decreasing the potential for future fires to climb into the crowns. This often kills shorter trees, without harming the larger, older ones. This is apparent post-fire by the common site of red

	other words, if one branch was killed by fire, the whole tree might become enflamed, which would in turn ignite at least some of the remaining trees in the stand. This is the very result the project is supposedly designed to prevent or reduce.	needles covering the lowest branches of otherwise healthy trees.
Boggs, Denise	Burning outside the breeding season would help reduce impacts to MSO, as noted at DEIS p. 184. However, there is no analysis of how MSO might be affected by these non-breeding season treatments. This is important because there is considerable evidence that some MSO remain on or near their breeding grounds all year long. FWS, 2012, at 27. Winter detection of MSO is difficult because they do not vocalize at this time of year (ibid), so it is possible that winter occupancy of breeding habitat by MSO is even higher than currently suspected. Research and monitoring must be used to design and implement activities in ways that ensure that wintering owls will not be disturbed.	137-54: Because there is evidence that some MSO remain on their breeding grounds we assumed that an unknown quantity of owls could be disturbed by winter activities. The level of disturbance would be reduced because the owls do not have the same degree of site fidelity as when nesting and the disturbance would not threaten viability of eggs or leave nestlings vulnerable. Because fire is part of the evolutionary landscape of MSOs, the potential disturbance was considered worth the resulting risk reduction in crown fire. Simultaneously, fire may reinvigorate understory development, thereby benefiting owls by improving prey species habitat. More details on disturbance to owls can be found the BA and BO incorporated into appendix 2 of the final wildlife report. Monitoring the effects to owls is also part of the proposed actions. See appendix E of the FEIS for details on the MSO monitoring plan. 137-55: Consultation is required under section 7a2 of the Endangered Species Act whenever there is a nexus of federal activity and effects to listed species and/or their habitat. Formal consultation with FWS occurred after the DEIS when the project activities were finalized and described. The results of consultation are presented along with the FEIS and the final wildlife report. The biological opinion is available for review on the project's website and appendix E of the FEIS includes the MSO monitoring plan that was developed with US FWS Both the BA and BO are included as appendix 2 of the final wildlife report. 137-56: The terminology of the 1995 recovery plan was maintained in the final wildlife report and FEIS wildlife section because the 4FRI was one of the projects caught in the middle of revising the recovery plan. However, the measures of the revised plan were what the FWS used to evaluate project effects on MSOs. The implementation plan in the FEIS (Appendix D) utilizes the 2012 recovery plan language and is designed to ensure the standards of the revised recovery plan will be met on the ground. The final vegetation and wildlife reports include a crosswalk from the original language used in the DEIS (such as MSO target and threshold habitat versus Recovery Habitat). The FEIS discloses how the
Boggs, Denise	All activity in PACs needs to undergo consultation with the Fish and Wildlife Service. FWS, 2012, at 274. This is especially the case because much of the project area is critical habitat for MSO; this includes restricted habitat (see subsection C below) as well as PACs. See DEIS Figure 45 at 179. C. Limit treatment in MSO restricted habitat. Under the Implementation Plan for the action alternatives, even-aged management could be used. DEIS at 612. However, forests used by MSO are typically uneven-aged with complex structure. FWS, 2012, at 25. Even-aged stands by definition have simple structure. MSO would not benefit from silviculturally-created even-aged stands. If restricted habitat in the project area will be manipulated, small even-aged groups could be created, but this should be done over time so that the groups are of different ages, and the overall landscape remains (or becomes) uneven-aged. The Implementation Plan refers	

	to Table II B 1 of the 1995 Recovery Plan (FWS, 1995) for both threshold and target habitats. DEIS at 612, 614. The Forest Service should use the 2012 Recovery Plan. Note there is a difference in the requirements for these type of habitats, which are now called "recovery" habitat : the 2012 Plan requires that greater than 30 percent of the BA in each area managed for recovery habitat must be in each of the 12-18 inch and greater-than- 18- inch size classes in both the mixed conifer and pine-oak types. FWS, 2012, at 278. Under the 1995 Recovery Plan, 10 percent of the stand density of trees had to be in each of the following classes: 12-18 inches, 18-24 inches, and greater than 24 inches, for mixed conifer, and 15 percent in each class for pine-oak. FWS, 1995 at 92. It is not clear if "stand density of trees" in the 1995 Recovery Plan is percent of stand density index or a percent of all the trees present. If it is the latter, it is similar to BA in the 2012 Plan. In any case, requirements for retaining medium- and larger-sized trees in recovery habitat, i. e., restricted habitat that is currently unoccupied by MSO but that is the most likely to become (or already is) good habitat for this species, have increased. The information in the DEIS does not provide a way to determine if the proposed project would	project transitioned from the previous recovery plan to the current recovery plan. The intent of the 2012 Revised MSO Recovery Plan is being met. The changes in stand measures brought forward in the revised recovery plan are not reflected in the DEIS or draft wildlife report because the revised recovery plan did not exist when the draft documents were created. See the responses to the previous comments describing how the standards of the revised recovery plan are being met in the final EIS and wildlife report.
Boggs, Denise	meet these new requirements. Failure to use the most current Recovery Plan is a violation of the ESA. D. 2012 Recovery Plan. It is clear the DEIS failed to use the current Recovery Plan. We are including an 8-page excerpt of cites from the 2012 Recovery Plan, the majority of which are being violated in this DEIS. We call your specific attention to the area in yellow highlighter on pages 3 & 4. This citation concludes "The Recovery Team recommends mechanical treatment in PACs ONLY if such monitoring occurs." P. 73. The DEIS has not included information demonstrating this monitoring has been done, and we don't believe it has been done based on the documentation provided. Appendix D in the 2012 Recovery Plan contains the protocol surveys required for MSO before management activities may occur. The DEIS is silent on this issue.	In regard to use of the revised recovery plan, see the responses to the previous comments on the use of the 1995 and 2012 MSO recovery plans. Thank you for providing your comments on the USFWS revised recovery plan. In regards to being silent on MSO monitoring, see the responses to the previous comments on MSO monitoring. We agree that data suggest declines may be occurring in numbers of MSO. Responses of resident MSO to landscape combination of no treatment, prescribed fire, and to high-severity wildfire have resulted in these declines. Most FS projects in AZ do not treat PACs and effects of high-severity, landscape-scaled wildfire probably affect the next largest group of PACs. Given the results of wildfires since 2000 and the decline in MSOs, management may provide an additional option to no action or high-severity, landscape-scaled wildfire. However, it is incorrect to refer to the PAC treatments proposed in 4FRI as restoration. Overlaying soil types with PAC boundaries indicated a restoration approach would
Boggs, Denise	The following is a summary of the Biological Opinion that accompanied the Revised Recovery Plan and was written by WildEarth Guardians: Approximately 90% of the population of MSOs exists in the national forests of the southwestern United States.	

	Accordingly, the FWS has always acknowledged that the USFS has a special role to play in the conservation and recovery of the MSO. Yet – now that we are two decades from listing – federal managers (including the USFS and the FWS) operate in an environment of extreme uncertainty. This uncertainty is, in large part, attributable to the failures of the USFS over the last two decades to put together critical information concerning MSO conservation. First, the USFS has failed to acquire basic baseline information as to the population trend of the Mexican spotted owl. Without this core population trend data, adaptive management is impossible. Second, the USFS has failed to acquire any information as to the cause-effect relationship between its forest treatments and MSO demographics. Under these circumstances, caution is indicated. This is particularly true in light of the fact that the available population trend data indicates that the MSO's population has not rebounded since listing. In fact, available studies show that populations have been declining. Despite the clear need for caution, the USFS has chosen another course with its various "landscape-restoration projects" such as 4FRI. These projects emphasize much more thinning and mechanical treatment in PACs and restricted habitat than allowed by the 1996 S/Gs. In one instance, the FWS characterized projects like this as those that are most likely to imperil the MSO's future survival. It is irrational for the FWS and USFS to use the threat of habitat-destroying fire as a pretext for the USFS's increasingly aggressive land management projects because the best and most recent scientific evidence – developed by the USFS itself – shows that MSOs not only survive, but thrive, in a post-fire environment. Under these circumstances – where the USFS has failed to acquire core population data and where the USFS has failed to acquire core information as to cause-effect relationships – any claim that the USFS is implementing "adaptive management" is absurd. In this light, the FWS's no-jeopardy opinions are simply arbitrary and capricious.	be far too intrusive to owls and their habitat. Therefore, we collaboratively designed with US Fish and Wildlife Service very specific treatments for thinning in PACs that is focused on retaining trees of all size-classes, maintaining dense forest structure, and still allowed retention and development of large trees (see page 248-259 in the draft wildlife report and the silviculture report for details). The threat of habitat-destroying fire prompted management, but does not justify management. The modeling results as reviewed by the USFWS is what justifies moving forward with management actions. The comment states that without cause and effect relationships, adaptive management is absurd. We cannot detect cause and effect relationships without monitoring our actions. If monitoring yields cause and effect relationships we will be in an informed situation in regards to whether management is meeting our goals or needs to be adapted.
Boggs, Denise	There is no cumulative effects analysis for the MSO in the DEIS – none. There is limited and inconclusive information in the Wildlife Report that does not replace the NEPA required cumulative effects analysis. The following exceprts are taken from the Wildlife Report. Total acres of treatment in MSO habitat within reasonably	9137-59) In the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of

foreseeable projects are not yet known because projects are still in the planning stages. However, the best estimate at this time includes about 10,155 acres of protected habitat (Table 205) and approximately 23,800 acres of restricted habitat (Table 206) is under consideration for vegetation treatments (Wildlife Report-323). NEPA requires that impacts be disclosed before decisions are made and does not allow best estimates. Furthermore, the Forest can't accurately predict impacts or mitigation if it has no idea where the MSO habitat is. "Changes to MSO habitat structure as a result of these combined actions are expected to be minimal." Ibid. This assertion is based on absolutely nothing. 10,155 acres of protected habitat and 23,800 acres of restricted habitat are both best estimates with no cumulative effects analysis. It is impossible for the Forest to determine that combined actions, which are not fully disclosed, and which have not gone through FWS consultation, could be minimal. "Changes are expected in MSO prey habitat. Decreases would occur in coarse woody debris, logs, and snags. Burn prescriptions and ignition techniques should limit overall losses of logs and snags." Ibid. The 2012 Recovery Plan requires an analysis of short-term impacts to prey species. This analysis can't be conducted because the Forest doesn't even know precisely what habitat will be impacted. "These projects represent polygons omitted from the 4FRI planning effort because planning was already in progress. Treating within these polygons will reduce fire threat for MSO habitat within the respective project polygon as well as reducing the threat of high severity fire starting in these projects and burning habitat outside the polygons. Given the dbh limits employed and the generally low intensity of the treatments, decreases in the risk of high severity fire and improvements to understory vegetation/prey habitat are expected to be short term only." Wildlife Report-424 "Cumulative effects will include local disturbance from noise and potentially additional disturbance from smoke. Individual projects include one on the Williams Ranger District (Bill Williams Mountain) and projects distributed across the Flagstaff District from the San Francisco Peaks to the edge of the Mogollon Rim. Given the various stages of planning or implementation, project effects would be dispersed both spatially and temporally. Given the scale of the 4FRI analysis area the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and ongoing projects by the FS and identified each project by National Forest and Ranger District. Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 – 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 – 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 – 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321). These actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. By definition, foreseeable actions have to be estimated. If the project were finalized, it would be classified as "current and ongoing." However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects analysis for MSO was revised. The FEIS wildlife report states "Because of the size of the 4FRI analysis area and the large portion of the western UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects" (Wildlife

(593,211 acres), the amount of MSO habitat within the project area (194,855 acres), and the period of time over which treatments will be implemented (10 or more years), the cumulative effects are expected to be negligible relative to the scale of both time and space within which potential effects would occur." Ibid. Again these assertions are simply guess work with absolutely no empirical data to back them up. The "analysis" as it were is legally indefensible. "Although this alternative would treat PACs using a lower minimum value in PAC habitat relative to the other action alternatives, only 18 PACs are proposed for treatment, so the effect would be limited when averaged across all the remaining PACs." Wildlife Report-243. Please document where the Recovery Plan states the FS can average habitat across ALL PACS. Nowhere is this stated or permitted. "If work were completed in 10 years, on average about 8,700 acres of MSO habitat would be mechanically treated and 11,255 acres prescribed burned each year under alternative C." Wildlife Report-242. We find it simply amazing the FS believes it can actually get away with admitting this level of activity in MSO habitat with virtually no analysis of cumulative effects to that habitat. The point of an EIS is to disclose impacts not guess or give estimates of what may happen. The graphs provided on pages 245-246 of the Wildlife Report can't possibly be accurate and at best are guesses or estimates due to the fatal flaws in the opinions rendered. "Mechanically treatments would take place within 18 of the 110 PACs occurring within a ¼ mile of the project area boundary (16 percent) under alternative C. This includes 10,776 acres out of 35,566 total PAC acres in the treatment area (30 percent). Low severity prescribed burning would occur in all 72 PACs within the treatment area. Eighteen PACs would be treated mechanically and 54 PACs would receive burn-only treatments. Although the implementation schedule is not yet known, on average 1.8 PACs would be mechanically treated per year if 4FRI implementation lasted 10 years." Wildlife Report 251. Again, NEPA requires that the "effects" including direct, indirect, and cumulative be disclosed on proposed activities. Simply stating what the activities are and making estimates and guesses about the outcome does not comply with NEPA's requirement to take a "hard look" at project impacts. "The wildlife Report page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers. comm. 2006). Wildlife habitat in the form of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, p153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page 400 to 412 of the wildlife report. Similar to MSO, the goshawk cumulative effects analysis has been revised since the DEIS was published, see the FEIS, chapter 3. It is important to note that the DEIS and EIS are NEPA projects. The MSO Recovery Plan does not identify NEPA requirements. The recovery plan provides guidance for Endangered Species Act analyses. However, cumulative effects analyses are defined differently in NEPA and the ESA. However, we have used the MSO Recovery Plan to organize our databases and analyses so that the EIS and the BA are consistent. The management effects to PACs are discussed across all PACs. Page 73-74 of the draft wildlife report states that patterns in habitat conditions and changes resulting from proposed actions are similar across scales. Therefore, habitat affects are typically summarized at larger scales to facilitate the discussion across the 4FRI treatment area. This same paragraph discloses that details at

analysis for the Kaibab forest plan concluded the Kendrick PAC consisted of mixed-conifer habitat. The Kaibab used a mid-scale analysis (100-1,000 acres) for evaluating effects of the proposed land management plan. The 4FRI analysis is based on a finer scale and delineated individual pine stands within the Kendrick PAC." Wildlife Report-252. What is the rationale for each forest using different scales? "Snags greater than 18 inches dbh would remain unchanged and would, on average, be slightly below forest plan direction (Table 77)." "Large snags are currently well below forest plan guidelines in even relatively "natural" areas (Ganey 1999, Waskiewicz et al. 2003)." Wildlife Report-264. Then why is the Forest proposing to log 18" – 24" dbh trees in Alternative C (Wildlife Report-259)? These trees should be left as habitat or for replacement snags particularly if Forest Plan direction is currently being violated. Snags are the most important owl habitat used to provide structure to nesting habitat and also used for roosting. If snags are under Forest Plan guidelines across the forest, that leads to the quality of owl habitat currently without any treatment. The Forest is going to have a difficult time explaining why it is proposing to log the largest diameter trees reducing quality owl habitat when that habitat is currently below threshold values. This is further supported by this statement: "Reduced BA and intermittent openings would increase light, moisture, and nutrient availability for herbaceous understory species. Understory response in threshold habitat is currently low, with biomass index values averaging 14 and 20 lbs/ac in RUs 1 and 3 respectively, and would remain low after treatment (Table 83)." The Wildlife Report speaks to improving MSO habitat in 2050 but fails to analyze the implications of projects now and for the next 37 years, other than to announce guesses and estimates. A threatened species requires far more in depth analysis of proposed projects. "Prescribed burning would occur in all 72 PACs in the treatment area, including 56 core areas (Appendix 14). Prescribed burning would occur on all 35,566 total PAC acres in the treatment area." Wildlife Report – 256. What happens is one of these burns gets out of control? The DEIS is silent on this issue. "Post-treatment modeling indicates that the amount of ponderosa pine forest occurring in FRCC 3 across the general treatment area would decrease to zero in 2020 under

finer scales can be found in appendices 15, 16, 17, and 18. A PAC-by-PAC description is presented in appendix 16. There are 26 references to appendix 16 in the protected habitat discussions to remind the reader that more detail is available in appendix 16 PACs by treatment type and provide detailed effects to forest structure and prey habitat for each individual PAC. It also provides the values of each forest and prey habitat metric summarized for all PACs within each treatment type. This same appendix provides results of treatments by the same measures organized by alternative by subunit to provide another spatial perspective on the impacts to protected habitat across the 4FRI landscape. In the final wildlife report, the BA was included in appendix 2 and provides another review of all proposed actions in a PAC-by-PAC format. Trying to provide this level of detail in the general text would add volume and complexity to an already large and complex document. It was felt that trying to streamline the text while still providing the background detail and context would aid the reader to in better understanding what was being proposed, where it was proposed, and what the effects were to owls and their habitat. In regards to the table on pages 245 and 246, it represents years of work developing large-scale data bases, organizing the data and running it through the forest vegetation models, summarizing the output by appropriate alternative and forest metric, and then interpreting those outputs in the accompanying text. The statement extracted from the wildlife specialist report regarding the average number of PACs treated per year is part of the introduction and overview of actions proposed in protected habitat under alternative C. The hard look requirement for protected habitat follows under the heading "Forest Structure and Density in MSO Habitat" and continues through "MSO Prey Habitat" and "Fire Effects" (pages 252 – 258) of the wildlife report. The same organizational scheme applies to the following section labeled "Restricted Habitat" (pages 258-269). Additional information is provided for other habitat effects that includes meadows and aspen and also addresses disturbance to owls. See sections labeled "Other Habitat Effects" (pages 269-271) that includes "Meadows and Aspen" (pages 269-270), and "Disturbance" (pages 270-271). Direct and indirect effects are summarized on pages 271-271) and the rationale for the determination of effects is on pages 274-276. Alternatives A, B, and D have analogous

alternative C, a reduction of nearly 298,000 acres (Table 78). This change would greatly decrease the risk of high-severity fire moving into protected habitat and increase the potential for managing unplanned ignitions for resource benefits. Combined, this would further decrease the fire risk to MSO habitat. While the risk within nesting and roosting habitat would remain high, the decrease in FRCC 3 across the landscape would help mitigate the threat of losing this habitat to high-severity fire." Wildlife Report 256. We would agree that eliminating 298,000 acres of owl habitat in the next 7 years would reduce the fire threat – it would also reduce owl habitat and owl populations resulting in take in violation of the ESA. Impacts are not analyzed or disclosed. "Mechanical treatments would occur on about 71,603 acres of restricted habitat, or 94 percent of total restricted acres in the treatment area. This includes about 97 percent of the total target and threshold acres. Although the implementation schedule is not yet known, on average 7,344 acres would be treated per year if 4FRI implementation lasted 10 years. On average, this would equal about 10 percent of the restricted getting treated in a given year. All restricted habitat (100%) would be prescribed burned." Wildlife Report-258. Again, the FS proposes to treat 97% of the total restricted acres and states the implementation schedule is unknown. "Disturbance could occur as a result of project-related activities including moving and operating harvest machinery, hauling forest materials, building fire line, managing prescribed burns, smoke, personnel in the field, and road maintenance and construction. Noise disturbance from project activities may disturb MSO. Alternative C would mechanically treat 82,344 acres of MSO habitat." Wildlife Report-270. "Disturabance" is otherwise known as "take" under the ESA. We fail to see how the FS expects the FWS to consult on this project considering all of the unknowns? If the FS proceeds we request the BO the FWS develops be included as a PDF along with ALL the specialist reports developed for this proposal.

analyses. The evaluation used for these analyses are presented on pages 189-191. Actions common to alternatives B-D and not included in the pages identified above are on pages 200-211. These analyses incorporated cumulative effects (see response to comment 57 above) and effects of climate change (pages 173-178). Further support for these analyses can be found in appendices 1 – 4 (pages 472 – 551), appendices 7 and 8 (pages 593 – 688), appendix 12 (page 705), and appendices 14 – 19 (pages 748 – 847). Forest plans are forest-wide analyses that, by themselves, do not cause ground disturbing actions. Individual projects are site-specific, typically leading to ground disturbance. While the 4FRI is nearly at a national forest scale, the analyses are typically derived from site-specific data. This is the case for PAC treatments proposed in the 4FRI versus the mid-scale vegetation analysis done for the Kaibab Forest Plan. As the analysis displays, tress 18" dbh and larger would typically increase in protected, threshold, and target habitats. This is particularly true for trees 24" dbh (see table 76, pages 253-254; table 80, pages 260-261; and table 81, pages 261-262). These habitats currently or could soon provide nesting and roosting habitat. Cutting trees 18" dbh and greater is not proposed in any of these habitats. Tress 18" dbh and larger would commonly decrease by about 2% in restricted "other" habitat (table 82, pages 262-264). This habitat is intended to serve multiple objectives, unlike the other MSO habitats that focus on nesting and roosting. Trees 18" dbh and larger could be cut in restricted habitat outside of target and threshold habitat to create openings, including interspace. Small mammal prey species typically increase with decreasing canopy cover (see appendix 8, page in the wildlife report). Creating canopy gaps greatly increases understory response (i.e., food and cover for MSO prey species) and adds to forest resiliency, an issue in the commonly dense conditions that occur in MSO habitat. Increasing resilience will improve the probability of retaining intact habitat, even with stochastic events such as increases in forest pest insects and diseases (see pages 23, 33, 57, 62, 63, 81, 86, 97, 175, 176, 185, 194, 241, 274, 304, 319, 332, 411, 422, 425, 601, and 603). Therefore, proposed treatments in restricted "other" habitat are intended to increase the proportion of trees 24" dbh, enhance foraging opportunities, and increase forest health, with target and threshold habitats providing future nesting and roosting habitat. As a point of

clarification, snags are not “the most important owl habitat.” They are a component of MSO habitats. Owls nesting in snags typically select oak snags which can develop into characteristic cavities. The 4FRI is not proposing harvesting any oak and includes a site-specific design feature to retain and develop large oak, i.e., no oak would be cut as part of this project. MSO nests in pine tend to be stick structures in live trees. Owls in the 4FRI area rarely nest in pine snags. Nevertheless, no snags are proposed for cutting except out of safety concerns or operational necessity. This is expected to result in a minimal reduction of large snags. Perhaps the most important habitat component of MSO habitat is trees greater than 24” dbh. The emphasis on increasing tree growth rates and retaining large trees comes from the MSO Recovery Plan (1995) that states “[r]etaining large trees is desirable because they are impossible to replace quickly and because they are common features of nesting and roosting habitats for the owl.” Snags 18” dbh and larger are important for wildlife, including MSO prey species. In general, the larger the snag diameter the greater its use by wildlife. One role of trees greater than 24” dbh discussed in the recovery plan is their potential to develop into large snags and logs. The recovery plan states that providing for a succession and adequate abundance of trees greater than 24” dbh will also provide for an adequate flow of large snags in the system. The proposed cutting of trees 12 to 23.9” dbh is predicted to increase trees greater than 24” dbh by 30 to 100% in the year 2050 (see table 76, pages 253-254; table 80, pages 260-261; table 81, pages 261-262 and table 82, pages 262-264). The forest is not proposing cutting “the largest diameter trees”. Throughout the entire MSO analysis tree size is discussed in terms of 3 classes: 12 to 17.9” dbh; 18 to 23.9” dbh, and trees greater than 24 inches dbh. By default, this creates a fourth size class of trees less than 12 inches dbh. Nowhere in this analysis is there a reference to cutting the largest trees. There is, in effect, an 18 inch diameter cap in MSO protected, threshold, and target habitat. There is a 24” dbh cap in restricted “other” habitat. In all MSO habitats the emphasis is on cutting trees 12 to 17.9” dbh or smaller. The frequent references to "logging the largest trees" suggest the reader did not review the sections on treating MSO habitat that describe the light thinning approach using site-specific decisions to decrease competition between large trees and the uncharacteristic ingrowth of small trees.

These descriptions can be found in the wildlife and silviculture reports and the DEIS, as well as in the implementation plan (appendix D) of the DEIS. Treatments were developed in cooperation with the USFWS and are intended to improve MSO habitat as described in the recovery plan. The use of 2050 was to provide more time for differences between treatments to become apparent. It was felt that this approach would better illustrate the greatest degree of impact. However, based on comments about immediate results from treatments, more attention was placed on immediately after treatment. The drawback to this is that, for most metrics, differences will be more subtle. The FEIS includes habitat responses for 2020 as well as results for no action and 2050 in tables for effects to MSO by alternative to better illustrate results of the proposed actions. The DEIS was silent on what would occur if a prescribed burn "got out of control." NEPA does not analyze the risk of unintended actions. Appendix C of the DEIS includes design features and mitigation to minimize the risk associated with fire and to help maintain fires at low-severity (see design criteria numbers; FE12, FE13 (page568), W12, W13, W18, W22-W25 (pages 593-595)). However, because of the unusual size of the 4FRI both spatially and temporally, we recognized that the probability of a fire burning out of prescription was also likely greater than for most other projects. Although this risk is not quantifiable, a discussion of unintended adverse effects from burning was included in the BA and was brought forward into the FEIS. The document identifies 112,546 acres of MSO habitat, i.e., the ponderosa pine-Gambel oak vegetation type, that would be treated in alternative C (DEIS pages 85 and 184). The nearly 298,000 acres described as “ponderosa pine forest” in the text and table on page 256 of the wildlife specialist report is as stated, i.e., ponderosa pine forest. MSO habitat is a subset of this acreage (see the discussion of vegetation cover types within the project area starting on page 57 of the draft wildlife report). How MSO habitat is different from and was delineated separate from the general ponderosa pine forest is described on pages 31-37 of the wildlife specialist report. The wildlife specialist report discusses the status of ponderosa pine, ponderosa pine/Gambel oak, and other vegetation types on pages 56-58. A visual diagram of the stratification of ponderosa pine and the 112,546 acres of MSO habitat is on page 64. The status of MSO habitat in the context of

Boggs, Denise	Alternative C - Determination of Effects for MSO (taken directly from Wildlife Report 274-276): Alternative C proposes the most treatments in MSO habitat. As a result, more acres of habitat are moved towards desired conditions than under any other alternative. The determination of effects for the Mexican spotted owl habitats is based on design criteria, mitigation, proposed forest plan amendments, the above effects discussion, and the following: • By design, mechanical thinning and low severity prescribed burning within MSO protected habitat would follow the intent of the MSO Recovery Plan and respective forest plan guidelines as amended; prescribed burning would not occur within or adjacent to PACs during the breeding season • By design, mechanical thinning and low severity prescribed burning within threshold, target, and other restricted habitat would follow MSO Recovery Plan and respective	this landscape is provided on pages 71 – 75, including maps showing where the different habitats occur within the overall ponderosa pine forest. Current forest structure in MSO habitat is summarized on page 85-86. Within these forest structure discussions it is clearly stated that pine/oak is the only MSO habitat proposed for treatment, i.e., mixed-conifer and canyon habitats will not be treated as part of the 4FRI project. The discussion and display of FRCC across over 500,000 acres of ponderosa pine forest (Table 78) and the reference to 298,000 acres in FRCC 3 is NOT a reference to the 112,546 acres of MSO habitat. Therefore, the statement regarding "eliminating 298,000 acres of owl habitat…" is incorrect in both scale and intensity. The only instance where forest would be eliminated would in instances of grassland restoration and this is based on soil types indicating historic grassland where trees currently dominate. Savanna restoration, another soil-based delineation, would retain forest, albeit at reduced coverages. The forests have consulted with USFWS on this project and on October 20, 2014 a Biological Opinion was issued for the selected alternative. The project is not in violation of the ESA. The BA and the Biological Opinion are both included as appendix 2 of the wildlife report. The BA Biological Opinion will also be available online with the FEIS and all specialist reports. The BO will also be available on the FWS Arizona Ecological Services website along with all other completed consultations. (137-60) Thank you for your position statement. The referenced pages are part of the direct and indirect effects to MSOs and are not part of the cumulative effects analysis. See the response to 137-59 regarding cumulative effects. As described in the specialist report, the design and intent of the MSO treatments was to improve MSO habitat as defined in the recovery plan. The added benefit of reduced risk of high-severity fire is an artifact of, but not the objective of the treatments in owl habitat. As observed in the comment, a review of or references to Bond et al. (2009) was not included in the draft wildlife report. A review of that article and other related articles has been added to the final wildlife report and the FEIS. Bond et al. (2009) concluded that most owls foraged in post-high-severity burned forest more than in all other burn categories within 1 km of the center of their foraging areas. Beyond 1.5 km there were no discernible differences in use

forest plan guidelines as amended • Mechanical thinning in 18 PACs and low severity prescribed burning in 72 PACs, including core areas, may cause short-term displacement to foraging and roosting MSOs outside the breeding season • Improving stand structural and spatial conditions would meet short-term objectives of improving overall forest health and long-term objectives of increased forest resiliency • Fire behavior in protected habitat would be changed in this alternative, with 83 percent of the area supporting surface fire in 2020 and only five percent of the area at risk from active crown fire • About 20 percent of the total road miles in 58 PACs would be decommissioned after treatment activities, lessening the amount of long-term disturbance to MSOs and their prey that is associated with access; road segments in three PACs, including core habitat in one PAC, and in restricted habitats would be relocated to provide long-term protection for ephemeral stream channels and the habitat they support • Fire and smoke effects from prescribed burning may disturb individual birds in and adjacent to the treatment area, but timing restrictions and low severity burn prescriptions would reduce impacts and largely lead to no or only short-term effects; however, the amount of burning across the landscape under this alternative creates the potential of smoke settling into a PAC, potentially leading to adverse effects to individual owls • Post-treatment growth rates of trees would increase, tree resiliency to drought and insects would improve, and more of the total BA would be occurring in larger size classes, improving MSO habitat components in both the short- and long-term • Large snags (greater than 18 inches dbh) are currently below forest plan guidelines; future snag recruitment is expected through existing insect and disease activities and impacts of low severity prescribed burning. Snag development is expected to occur as more trees attain larger size-classes and meet the size-class distribution recommended in the Recovery Plan; snag retention would improve through road decommissioning; over the long-term, snag development and retention is expected to improve after project implementation • Key sites that can support diverse and abundant understory vegetation within MSO habitats would be improved or restored for both the short- and long-term, including about 23 springs, and about 5 miles of ephemeral channels, 3,870 acres of

patterns among burn severities. However, the USFWS concluded that nesting and roosting habitat is the limiting factor for spotted owls, not foraging habitat. Bond et al. (2009) reported that spotted owls selected low-severity burned forest and avoided moderate- and high-severity burned areas for roosting. Unburned forest was used in proportion to its availability. Although the 4FRI addresses a different subspecies occurring in a different forest community, our proposed owl treatments are in alignment with their findings.

meadows, and 940 acres of aspen. There is a strong link between raptors and their food and conserving and enhancing prey habitat is expected to benefit MSOs (Ganey et al 2011). • The development of 8,412 acres of restricted target and threshold habitats would be managed towards meeting a 110-150 BA for MSO nest and roost habitat as recommended in the draft MSO Recovery Plan (USDI FWS 2011) • Total treatments in MSO habitat include 82,344 acres of mechanical thinning and 112,546 acres of low severity prescribed burning and would provide for understory grass/forb/shrub release to improve habitat components for MSO prey base; improvements would be maximized in the short-term and while improvements would decline, they would be maintained above existing conditions over the long-term; overall this represents the most acres of MSO habitat improved through treatment and hence the largest understory response of any action alternative • Thinning and low severity prescribed fire on 67,378 acres of restricted "other" habitat would provide for "groupy" tree structure and canopy gaps resembling historical conditions at spatial scales capable of reestablishing understory regeneration and reducing risk of active crown fire over both the long- and short-term • Implementing both mechanical and prescribed burn treatments would reduce hazardous fuel loads, reducing the potential for future stand replacing, high severity crown fire and also protecting soil resources by reducing severity of surface fires over both the long- and short-term; however, these benefits would decrease in the short-term without maintenance burning • Alternative C would preserve current old growth habitat and develop old growth components in 100 percent of MSO protected, target, and threshold habitats (45,168 acres) and additional acreage in restricted "other" habitat (see Silviculture report), sustaining key MSO habitat components over the long-term • Forest conditions within the historical range of variability (FRCC 1) would be returned to 19 percent of the landscape by the year 2020, thus reducing the potential for large-scale MSO habitat loss from high-severity fire; while this benefit decreases in the long-term, the amount of area in FRCC 1 remains higher compared to existing conditions, providing both short- and long-term benefits • Forest conditions moderately altered from the historical range of variability

(FRCC 2) would be returned to 78 percent of the landscape by the year 2020, thus reducing the potential for large-scale MSO habitat loss from high-severity fire; while this benefit decreases in the long-term, the amount of area in FRCC 2 remains high in alternative C (similar to alternative B) compared to existing conditions or alternative D, providing both short- and long-term benefits • Alternative C is the only alternative to reduce FRCC 3 to zero in the year 2020 and by 2050 about a third of the ponderosa pine forest (33 percent) would move into FRCC 3, providing the best short- and long-term benefits relative to the historical range of variability This is the only alternative to reduce fire severity within core areas. MSO stratified habitat will provide for a mosaic of desired stand structure conditions, improving habitat heterogeneity and vegetative diversity. This mosaic would allow for a diversity of potential fire effects, thereby increasing opportunities for the maintenance of forest structure and function using planned and unplanned ignitions in the future (up to 30 years). Canopy characteristics and surface fuel loading combine to produce combinations of surface fire intensity and physical structure (the height, density, and horizontal and vertical continuity of canopy fuels) that can produce crown fire under a given set of conditions. The closer conditions are to this threshold, the faster it will deteriorate to a point where crown fire is possible. The changes in protected, target, and threshold habitats in alternative C would maximize future opportunities to manage fire and avoid stand replacing events. Alternative C would provide and sustain long-term nesting and roosting habitat while reducing potential risk of high severity wildland fire and other stochastic events. To mitigate adverse effects associated with treatments within protected habitat, no treatments would occur during the breeding season and no activities would occur within the core area. Unintended smoke from first-entry burns that settled in PACs could adversely affect egg development or nestling survival by flushing the female, or affect nestling development through lung damage. The majority of these conclusions are not substantiated in the CEA and admittedly are estimates and best guesses. What is clear that the FS in its rush to reduce any threat of wildfire, will destroy owl habitat, displace owls and likely take owls. There is absolutely no analysis of

the best available science pertaining to owls and fire. Owls evolved with wildfire over millennia. Owls use burned habitat at all levels – high, moderate, and low severity. Owls have actually shown a preference for foraging in high severity burned habitat (Bond 2009). The alleged CEA for MSO is fatally flawed and legally indefensible. We strongly encourage the FS to abandon this 4FRI "landscape level" analysis because it is not an analysis – it is simply a compilation of best guesses and estimates of potential impacts.

VI. THE PROPOSED PROJECT WOULD CREATE HABITAT THAT IS TOO OPEN FOR GOSHAWK. As with MSO, treatments in goshawk habitat designed to significantly reduce the susceptibility to stand-replacement fire would significantly degrade or destroy the habitat. The proposed treatments are too intense and would cause unacceptable degradation of goshawk habitat. Treatments in post-fledging family areas (PFAs) in ponderosa pine could result in habitat that is 55 percent interspace (i. e., in permanently non-forested openings between tree groups – see DEIS at 521, 525), with up to 80 feet between tree groups. DEIS Appendix D, Implementation Plan, at p. 628 et seq. Basal area could be as low as 70 square feet per acre (ibid.), and as low as 30 in the pine-sage type (id. at 636). After proposed treatment, Restoration Unit (RU) 3 would be 46 percent open/ or very open, and RU 4 would be 57 percent open or very open. DEIS at 706. With this amount of open areas, it is not clear that PFAs will have canopy cover exceeding 50 percent as recommended by Reynolds et al, 1992, at 14. Reynolds further recommended that one-third of the mid-aged portion of each PFA have at least 60 percent canopy cover, and the remainder at least 50 percent. Id. at 23. It is the mid-aged trees in goshawk habitat that would be targeted for removal under the project because VSS classes 3 and 4 are said to be in abundance. DEIS at 215, 218. Any area that is 55 percent interspace certainly would not have 50 percent canopy cover. Tree groups would be 0.1 to 1.0 acres in most of the treatments within goshawk habitat. PFAs Id. at 629, 632, and 634. This would well-fragment the habitat, as small islands of habitat would be retained in a sea of non-habitat, at least in the treatments with the higher percentage of interspace. Note that Reynolds' direction is to not include natural and permanently created openings

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(137-61) Post treatment landscape openness in goshawk habitat was presented as issue 3 in the DEIS. In the DEIS, the analysis of goshawk habitat components is located on pages 126 to 133 of the DEIS. In response to comments on the DEIS and to address changes since the DEIS was published, the goshawk analysis was revised and additional analysis has been added to the FEIS. A summary in chapter 2 on the environmental consequences for goshawk includes the following effects: Alternative A would not improve habitat quality, resiliency and sustainability. In all goshawk habitat, no action results in the habitat being at highest risk of increasing densities, increased fire risk, and increased to insect and disease risk. These results are contrary to forest structure, forest health, and resiliency and function desired conditions. Mechanical treatments in alternatives B, C, and-D would improve age-class diversity and move towards more open, uneven-aged conditions. The percent of SDI max would decrease in all action alternatives as a result of the proposed thinning. The percent of SDI max in LOPFA habitat would decrease to the high end of moderate density in alternatives B and C and decrease to high density in alternatives D and E in the short term (2020). All action alternatives would shift or remain in high density by 2050. Primary benefits from these changes in forest structure are that the risks of large scale loss of habitat from disturbances such uncharacteristic fire, bark beetles, and density-related mortality would be reduced. Trees greater than 24 inches d.b.h. in uneven-aged forest structure would increase as a result of these treatments in all alternatives. Alternatives B and C would increase the distribution of this size class to 20 percent of the area by 2020 whereas alternative D would increase to 15 percent, and alternative E would increase to 18 (from an existing distribution of 11 percent). In alternative A increases the percent to 13 by 2020. Trees

in the acreage of the PFA. Reynolds et al, 1992 at 22-23. In other words, some of the proposed treatments would turn existing PFAs into non-PFAs. In lands outside PFAs, up to 70 percent could be interspace in wildland-urban interface (WUI) areas and 55 percent elsewhere, with interspace width up to 120 feet and 100 feet, respectively. DEIS at 620. The BA would be 50-70 for uneven-aged management and WUI areas. For intermediate thin areas, BA would be 70-90 with up to 55 percent interspace. Id. at 610. This would fragment goshawk habitat, just like in PFAs. In pine-sage, BA would only be 30-50. Id. at 625. The Forest Plan amendment allowing the above-described destruction of goshawk habitat (see the amendment at DEIS pp. 520 et seq.) must not be approved. It would allow interspaces as wide as 200 feet. Id. at 525. It would also direct that canopy cover in PFAs only be measured within tree groups, and not in interspaces and areas in VSS 1-3. Id. at 624. That is unacceptable – it would allow a scenario where more than half of the area was in interspace, meaning the canopy cover for the PFA was low, but it would comply with this amendment provision if the cover was high enough within the groups. A relatively high canopy closure (50-60 percent) is needed in PFAs to protect young goshawks from predators. See Reynolds at 23. Goshawk habitat occupancy is already declining, especially on the Kaibab National Forest, where monitoring has been more intensive. See Wildlife Report at 97-100. This is the case even though projects after 1996 “have been designed to move the landscape toward the desired conditions for northern goshawks". DEIS at 222. It is thus possible that the large amount of treatment in goshawk habitat would cause further decline in occupancy. Fires could be used to reduce fuels in goshawk nest stands and PFAs. Id. at 637, 638. A concern expressed above for burning in MSO habitat also applies here: burning in dense stands risks igniting a stand-replacement fire. Another concern previously expressed about burning in MSO habitat applies to goshawk habitat: losing coarse woody debris, which is a critical attribute of PFA habitat. See Reynolds et al, 1992, at 6. Woody debris is to be “[p]resent throughout the PFA” (id. at 23), and the same in the foraging area (id. at 27). Fire in goshawk habitat could be beneficial if it reduces fine-scale (less than three-inch diameter) surface fuels; greater than 24 inches d.b.h. in even-aged forest structure would increase to 4 percent in alternatives B and C; 3 percent in alternative D; 2 percent in alternative E; and not change in alternative A (from an existing level of 1 percent).Alternatives D and E would increase the distribution of trees in the next largest size-class (18 to 23.9 inches d.b.h.) in uneven-aged condition to 28 percent; alternative C would increase the distribution to 30 percent and would increase to 29 percent in alternative E. In comparison, alternative A decreases the percent in 2020 to 12 percent but increases by 2050 to 27 percent. In even-aged forest structure, this next largest size class would increase to 22 percent in alternatives B and C, increase to 19 percent in alternative D and increase to 18 percent in alternative E, from an existing level of 8 percent. In alternative A, there is an increase of 21 percent by 2050. Growing trees into the largest size-classes takes time and creating more large trees would be an important contribution to prey and foraging habitat. Substantial increases in the average pounds per acre of understory biomass in all action alternatives would improve cover and food for birds and mammals preyed upon by goshawks as well as the invertebrates that are an important food source for goshawk prey. Alternatives B and C would have the most improvement followed by alternatives E, then D. This would also favor conditions conducive to the spread of low severity fire rather than crown fire. Crown fire would have more severe effects to vegetation and soil. Prey habitat would improve as coarse woody debris increases to desired conditions by 2050. In the short term, tons per acre of coarse woody debris would fall below desired in alternatives B, C, and E. Only alternative D would meet desired conditions in the short term (2020). Alternative A, since there are not treatments proposed, would be at the highest risk of increasing densities, increased fire risk, increases to insect and diseases, and increased risks to goshawk LOPFA habitat. In response to feedback and comments received on treating less aggressively and leaving more large trees, in alternatives C and E canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.In the wildlife report that has been prepared for the FEIS, the determination of effect for goshawk for the preferred alternative states, “Implementation of alternative C may impact individuals, but is not likely to cause a trend to federal listing or

however, it could also burn up coarse woody debris, which is an important habitat component. Note that in four of the restoration units, the amount of coarse woody debris in pieces greater than 12 inches in diameter is well below the desired amount. Wildlife Report at 108. The Wildlife Report states that the Forest Plans allow prescribed burning in PFAs during the breeding season. Id. at 345. However, the Coconino Plan actually states: Limit human activities in or near nest sites and post-fledging family area's (sic) during the breeding season so that goshawk reproductive success is not affected by human activities. Id. at 65-11. An identical provision is in the Kaibab Plan at p. 31. Burning should not be done during the breeding season. Goshawks may have evolved with fire, as stated at p. 345 of the Wildlife Report, but chicks could easily perish, and adults could be forced to abandon nests, if smoke was too thick or lasted too long. Though past, present and future projects that might affect goshawk are listed in Appendix 12 of the Wildlife Report, there is almost no cumulative impacts analysis of effects from past, current and reasonably foreseeable future projects on goshawk habitat. See DEIS at 222, Wildlife Report at 357. This is a serious omission in light of the decline in goshawk occupancy discussed above.

loss of viability" (Wildlife Report, page 473, FEIS, chapter 3). Mechanical treatments in post-fledging family areas (PFAs) and lands outside of PFAs (LOPFAs) are based on the forest plans that incorporated elements of the Management Recommendations for the Northern Goshawk in the Southwestern United States (Reynolds et al. 1992) and other research on pre-settlement conditions in northern Arizona ponderosa pine forest (pages 15-22 in the silviculture report). Science opposing this approach is reviewed on pages 115-117. Similar to the MSO treatments, reductions in fire risk are a result of moving forest structure toward ecological restoration. However, moving the forests towards a more balanced state yield the benefit of reduced risk of high-severity fire in a fire adapted ecosystem. This would improve wildlife habitat and forest health while decreasing risk of high-severity fire and adding resiliency to predicted changes in climate. The subsequent paragraphs confuse the concepts of percent interspace and percent canopy cover. Percent interspace refers to non-treed space (i.e., area dominated by herbaceous plants) and percent canopy cover refers to the areas beneath the trees. In the referenced situation which is the most extreme end of the spectrum for treatments resulting in 40 to 55% openness, about 55% of the total area would be herbaceous cover but the objective within the tree groups would be 50% canopy cover. Group size and openness would follow the direction of the forest plans and Reynolds et al. (1992). The objectives are in alignment with the historic structure documented for ponderosa pine forests in northern Arizona. The degree of change is a reflection of how far current structure has evolved as a result of anthropogenic influences for over a century of direct and indirect management. The changes would benefit goshawks and their prey species (wildlife report pages 341-344 Reynolds et al.1992 pages 17 and 19 and appendix 3 page53).Currently goshawk habitat is trending away from desired conditions (DEIS page 52). After treatment, interspace would vary from10 to 55% of a given area unless the areas are located within or adjacent to communities (WUIs; DEIS at page 40). WUI treatments would occur in less than 3,000 of the nearly 400,000 acres of goshawk habitat. In addition, more open areas would include areas where watersheds associated with urban development are at risk such as Lake Mary, Rio de Flag, and Bill Williams watersheds. In pine-sage habitat, ponderosa pine trees are encroaching and shading

out the sage on about 5,261 acres. Without treatment, pine density is likely to increase and entirely shade out the sage component. The desired condition is to restore the historic pattern within the pine-sage mosaic and manage fire to enhance sage (DEIS at page 21). There is a need to remove post-settlement pine that is currently overtopping and shading sage, a habitat component critical to a variety of wildlife species. The preferred alternative, alternative C, includes both the large and old tree retention strategies developed by the 4FRI collaborative group (DEIS at pages 37 and 39). Regeneration openings greater than an acre in size would include reserve trees. Stocking rates would vary to create a range of tree densities. This variability is built into 5 different treatment strategies identified and described for LOPFAs. The goal is to create variable forest conditions resembling presettlement conditions and in alignment with the habitat definitions for LOPFAs in the forest plans, as amended. LOPFAs are characterized by relatively open forests with large trees and with small to medium sized (< 4 acres) openings (Reynolds et al. 1992, page 18). The ultimate goal is to provide habitat supporting sustainable and abundant prey (Reynolds et al. 1992, page 19). The open nature interspersed with groups of trees of variable density would resemble historical conditions, allow the use of fire on the landscape, and create, not fragment foraging habitat for goshawks. Desired conditions for tree group structure within PFAs are specific to mid-aged to old classes (VSS 4 to 6) and include open understories, interlocking tree crowns, abundant large limbs, and shade (DEIS page 628). Trees within the dominate and codominant crown position would have priority for retention within groups. Where age class diversity is not present, 1 to 10 suppressed and intermediate trees per group would be retained for vertical diversity. Interspace width between tree groups would average from 25 to 70 feet with a maximum width of 200 feet (DEIS page 630). Openings up to 200' wide are already allowed in the current forest plans and do not require an amendment. This is directly from Reynolds et al. 1992. Measuring within tree groups and not in openings matches the intent of Reynolds et al. (1992) as described by Reynolds (see notes in the project record). As the authors wrote in 1992, "As new research information becomes available, and as our understanding of the goshawk and its habitat use and preferences increase, these management recommendations will be refined" (page

9). The amendment provides disclosure and allows the 4FRI to meet the ecological needs of the goshawk. There will be areas left untreated to balance the needs for species associated with closed canopies (see the bridge habitat discussions in the wildlife report and the FEIS). In regards to goshawk nest sites and protection of juvenile goshawks, please note that no mechanical treatments are proposed for goshawk nest stands (DEIS page 638).In regards to the reference of declining goshawks on the Kaibab NF, the reference includes the comment on the remarkable consistency in goshawk occupancy and that "Overall, goshawks are closely tied to prey resources and less so to forest habitat type. If there is ample prey available with adequate nesting structure, goshawks will nest regardless if the habitat type is forests, woodlands, or shrub lands "(page 99). In addition page 102 states "Considering the information above, northern goshawks are assumed to be declining on the Kaibab National Forest. However, if future weather patterns produce good precipitation, the population could stabilize. Only precipitation can fuel forest productivity in terms of abundant seed crops which result in prey population increases that occur at greater frequencies. Continued reduction of forest stem density and basal area should ameliorate the stochastic nature of weather by reducing the threat of large-scale, high-severity crown fire, thereby helping stabilize the population." The focus of the 4FRI proposal is to restore forest landscapes and reduce the potential for severe fire effects (DEIS page 7). The risk of a prescribed fire going out of prescription is not considered near the threat of the unplanned ignitions that commonly burn in Arizona's fire-dependent ecosystems. Fire will burn some CWD and it will be low in many areas within the 4FRI treatment area after burning. However, modeling for this project and research suggest that it would be just a year or 2 before CWD levels once again meet desired conditions (DEIS page 160). Simultaneously, predicted surface fire would increase from about 64% up to 94% of the treatment area while active crown fire would decrease would decrease from 25% to 1-3% (DEIS page 158).The statements from the wildlife report and the forest plans are both correct. Human activities in nest areas and PFAs are to be limited, not excluded. The Coconino forest plan (this no longer applies to the revised Kaibab forest plan) also includes additional direction (page 65-11 Coconino Forest Plan) under the same section of the plan that discuss "Human

Boggs, Denise	VII. PROTECT SOILS. The DEIS (p. 25) states that 85 percent of the soil strata in the project area are in satisfactory condition. Treatments should not be done on those areas (15%) in less than satisfactory conditions. Use of heavy equipment for logging is particularly of concern, since such equipment use can cause compaction and displacement of soils, which would prevent or delay the establishment of herbaceous ground vegetation or regeneration of trees. Under the project design criteria, up to 30 percent of treated areas could have bare soils after five years. DEIS at 673. This is a violation of regional soil standards. The goal should be to	Disturbance": "Low intensity ground fires are allowed at any time in all forested cover types, but high intensity crown fires are not acceptable in the post-fledging family area or nest areas. Avoid burning the entire home range of a goshawk pair in a single year. For fires planned in the occupied nest area, a fire management plan should be prepared. The fire management plan should minimize the risk of goshawk abandonment while low intensity ground fire burns in the nesting area. Prescribed fire within nesting areas should be planned to move with prevailing winds away from the nest tree to minimize smoke and risk of crown fire developing and driving the adults off or consuming the nest tree." Given the full direction provided, prescribed surface fire within PFAs during the breeding season is in compliance with both forest plans. There is no evidence that "chicks could easily perish", but nevertheless there is a mortality risk. Mitigation such as raking around known nest trees, applying appropriate lighting techniques, and waiting for environmental conditions that best facilitate meeting burn objectives would be all be used (see design criteria W24, DEIS page 594). Detrimental smoke impacts are unlikely (wildlife report page 210). Smoke management is a basic driver of when to burn to avoid or minimize impacts to communities in and around this portion of the Coconino Plateau. Smoke settling for successive nights will periodically happen, particularly with burning in the autumn, but fire prescriptions do not allow setting fire if smoke will not lift and disperse during the day. Burning during the nesting season decreases the likelihood of smoke impacts to nestlings because of better air flow that time of year. As a result of comments on the cumulative effects section for goshawks, it was redone with more detail and more analysis. (137-62) The potential impacts to soil and water resources would not result in significant environmental effects. Therefore, it was not categorized as a "significant" issue. The project has been designed to maintain soil productivity and function and meet the Clean Water Act (routine disclosures). Chapter 3 of the DEIS disclosed the affected environment for each resource (including roads) and the direct/indirect environmental consequences associated with the action alternatives in chapter 3, from page 105 to page 332. Effects analysis of roads (transportation) can be found in the DEIS on pages 318-321. Table 31, chapter 2, page 96 of the DEIS provides a comparison of the predicted

revegetate affected areas within two years or less. The longer the soil remains bare, the more it is subject to erosion from wind and water run-off.

effects of proposed treatments by alternative. The best (and relevant) available science, information, first-hand knowledge of the resources within the project area and experience with past and similar projects informed the effects analysis. The DEIS included design features, mitigation measures and the following soil and water BMPs in appendix C, page 565 of DEIS. These features would be implemented (for temporary road construction) to maintain and protect soil productivity, minimize sediment delivery and improve and protect water quality. The chapter 3 soil and water analysis (DEIS, table 32) and the soils specialist report (pp. 62-92 and attachment 1, page 165) show less than 15 percent soil disturbance would occur (including temporary road construction) under all action alternatives. The alternatives would not exceed the 15 percent soil disturbance threshold that has been identified as maintaining long term soil productivity. The statement the author cites on page 673 of the DEIS concerning 30 percent of the treated areas could have bare soil refers to a trigger for a possible need for change on areas that have disturbance and refers to recovery of a site that has ground disturbance, and not that 30% of the project area would have ground disturbance. No new permanent roads would be constructed for this project. Temporary roads would be constructed to provide necessary access for forest treatments and decommissioned after use. The effects of roads are analyzed and disclosed in chapter 3 of the DEIS. Appendix C provides design features, BMPs, and mitigation measures to protect soils and water quality as they relate to roads. The Riparian and Water Quality Specialist's Report provides a detailed description of the effects of forest roads on page 50 and 62-64.In response to comments on the DEIS, a new design feature which addresses activities on soils with severe erosion hazard was developed. Design feature SW43 (FEIS Appendix C) was developed to protect long-term soil productivity and water quality: "Provide soil and site protection on newly disturbed soils located on temporary roads on soils with severe erosion hazard as needed. Avoid locating temporary roads on soils with severe erosion hazard. Where unavoidable, provide soil protection through implementation of any of the following methods to control sediment and protect water quality. Methods may include, but are not limited to: wattling, hydromulching, straw or woodshred mulching, spread slash, erosion mats, terraces, blankets, mats, silt

VIII. TREAT SLASH TO REDUCE SPREAD OF IPS BEETLE. DEIS at 684 states that ponderosa pine mortality from ips beetles (likely ips pini, or pine engraver) has increased greatly. It is well known that piling ponderosa pine slash can provide breeding areas for this insect, which then reproduces and attacks and kills or top-kills live pine. With the large amount of mechanical treatment of ponderosa pine proposed, a large amount of slash would be produced. Surface fuels already average about 11 tons per acre. Id. at 25. Significant additions of activity-generated slash could make the total accumulation above the desired range. We do not see a discussion of slash disposal in the DEIS. It seems to be assumed that prescribed fire would sufficiently reduce slash accumulations. However, there is a question of how safe such fires might be, given the dense stands. See id. at 21 and discussion in section V B above. Even if it did not risk causing crown fires, burning slash might burn up desired coarse woody debris, which is an important habitat component for both

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fences, riprapping, tackifiers, soil seals, seeding and side drains, and appropriately spaced water bars or water spreading drainage features. Temporary roads would be decommissioned and protected with any of the above methods". A new design feature was developed (FEIS, Appendix C) to clarify temporary roads would be decommissioned by the purchaser/contractor when mechanical treatments are finished using the adaptive management actions listed in Appendix A of the Transportation Specialist. Soil and site productivity can be negatively affected if protective design features and best management practices are not made part of the action. The 4FRI project minimizes vegetation treatment impacts to soil and site productivity through implementation of design features, mitigation measures and the following Soil and Water BMP's listed and located in Appendix C of the DEIS. They have been developed and will be implemented (for timber harvest and fuels operations and retention of coarse woody debris) to maintain and protect soil productivity, minimize sediment delivery and improve and protect water quality. The Chapter 3 soil and water analysis (and soils specialist report) shows less than 15% soil disturbance (average at the watershed level) would occur (including temporary road construction) under all action alternatives which is less than 15% soil disturbance threshold identified that would maintain long term soil productivity. The silviculture section of the DEIS in chapter 3 discusses the effects of piling and burning on page 141 of the DEIS. The soil specialist report discusses different logging systems and the amount of ground disturbance associated with each (p 77, 78, 80, 83 and 85). Mechanized harvesting is the dominant logging system being used and that harvests the tree and skids the entire tree to the landing where it is deli bed. The slash is then either piled or it is chipped and removed. Machine piling disturbs the most ground, so this was the method of slash disposal that was used in the soil analysis related to ground disturbance. Machine piles from activity fuels are generally located in openings in areas that have been harvested; hence there is high likelihood that the burning of piles will not cause an escaped fire. The soil specialist report for the DEIS (included as reference, DEIS p105) discloses different types of slash treatment and there effect on ground disturbance (soil specialist report p 77, 78, 80, 83, and 85), as well as the deleterious effects of burning piles to soils (soil specialist

	MSO and goshawk. We further recommend that slash not be piled, or that such piling generally be limited to hand piling. Machine piling can scrape off top soil and, with repeated passes over ground, cause soil compaction or displacement. Burning machine-constructed piles, which usually are large and contain at least some larger (greater than three inch-diameter) material, will sterilize the soil beneath them. Note that Reynolds recommends against machine piling in goshawk nest areas, PFAs, and foraging areas. Reynolds et al, 2002, at 22, 26, and 29, respectively. However, design criterion FE 4, DEIS at 569, indicates that machine piling and burning might be done under the project. CONCLUSION. The proposed project needs to be significantly reduced and redesigned. Cutting in MSO and goshawk habitat must be greatly reduced and eliminated in nest core areas. Prescribed fires, especially in MSO and goshawk habitat, must be burned only where and when there is assurance that crown fires will not result, and not during nesting season. A full cumulative impacts analysis on the impacts to MSO and goshawks and their habitat must be presented in the FEIS. No project should be approved unless or until there is a complete monitoring plan (including for impacts to MSO) in place, and sufficient funding to fully carry it out is assured. Additional alternatives, including at least one that describes a much smaller project, must be fully considered in the EIS. Large trees must be retained. Soils must be revegated as soon as possible after treatments. Slash must be treated to avoid breeding ips beetles, but machine piles should neither be created nor burned. Currently the DEIS is legally deficient. It did not rely on the appropriate Recovery Plan for the MSO and in general failed to use the best available science for MSO and Goshawk habitat management, and risk of wildfire. The many Forest Plan amendments are significant under NEPA and require an analysis of their own, because they would	report p 87). Page 523 of the DEIS discloses the preference of treating slash in PFA's that has machine piling as last method to treat slash for the Coconino NF and p 539 lists the same forest plan guidance for the Kaibab NF.
Boggs, Denise	dramatically change management direction in the Plan for MSO and Goshawk. They simply can't be a part of this DEIS.	(137-54) Thank you for your comments/opinions. See all previous responses.
Bower, Danielle	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI)	Thank you for your comment. Please see our response to Letter #19.

and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Boyer, Jan	The DEIS identified effects of smoke and particulate matter on "individuals with chronic obstructive pulmonary or cardiovascular disease of influenza, asthmatics, the elderly, and children" (at p. 166), without identifying any methods for mitigating these effects and ensuring a safe and healthful environment.	(122-2) Please see letter #183.
Boyer, Jan	You should not burn these huge amounts of forest. We want the forest for our children and their children. We need the forest to provide clear, clean O2. You should not use toxins to start fires. You should not have exceptions to kill the birds. You must not release this amount of CO2 and all the other toxins currently stored in the trees.	(153-1) Thank you for your comment. This letter is a duplicate of letter 183. Please see our complete response to letter 183.
Boyer, Jan	Old historical novels talk about the most brutal of conquerors, called that because they salted the ground and cut down the trees. There are many other alternative actions that would accomplish the stated purposes. We can have local wood harvesting co-ops like most countries do. We can educate homeowners to clear a defensible space around buildings, instead of clearing the entire forest. The Forest Service should preserve trees on steep slopes so all the dirt doesn't fall off. You should save the big old trees. You should commit to zero use of carcinogens. You could obey the law about songbird and spotted owl protection, wilderness protection, etc.	(153-2) Thank you for your comment. The project's purpose and need include restoring forest structure and pattern, forest health, and vegetation composition and diversity to benefit wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects.
Boyer, Jan	It is the "responsibility of the Federal Government to use all practical means… to… assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings." The DEIS identified effects of smoke and particulate matter on "individuals with chronic obstructive pulmonary or cardiovascular disease of influenza, asthmatics, the elderly, and children" (at p. 166), without identifying any methods for mitigating these effects and ensuring a safe and healthful environment.	(153-3) See our response to letter 183.
Boyer, Jan	The DEIS must include "means to mitigate adverse environmental impacts—here, impacts on these sensitive populations. The DEIS may not just say there will be impacts without saying how they will be mitigated.	(153-4) See our response to letter 183.
Boyer, Jan	Regarding these sensitive populations, The DEIS must, but does not, "include appropriate mitigation measures not already included in the proposed action or alternatives."	(153-5) See our response to letter 183.
Boyer, Jan	The EIS must include information on "the relationship between local short-term uses of man's environment and the maintenance and	(153-6) See our response to letter 183.

Boyer, Jan	enhancement of long-term productivity."This project will convert forests permanently removing around half the biomass of the project area, providing enormous quantities of wood products during the first ten years. Obviously such productivity cannot be sustained. The DEIS does not provide the required information about how this will enhance long-term productivity. These sections all require consideration of cumulative impacts and prohibit segmentation, i.e. breaking a large action "into small component parts." The DEIS addresses only cumulative impacts of actions within the Coconino and Kaibab National Forests, but not the cumulative impact of all of the actions in the Collaborative Forest Landscape Restoration Program. Each of the individual projects in the program is a "small component part" of the whole program, with cumulative impacts on climate change, air quality, public health, migrating birds, threatened and endangered species, and other environmental factors. The Forest Service is ignoring these cumulative, nationwide impacts through illegal segmentation.	(153-7) See our response to letter 183.
Boyer, Jan	Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." This DEIS is in flagrant violation of scientific integrity and accuracy. The DEIS references numerous scientific studies in support of conclusions that those studies do not support, and even contradict. The DEIS is internally inconsistent, self-contradictory, and full of completely outlandish statements.	(153-8) See our response to letter 183.
Boyer, Jan	"Not more than a total of 20,000,000 acres of Federal land may be treated under authorized hazardous fuel reduction projects." 16 U.S.C. § 6512(c). Since the passage of this Act, about 20,000,000 acres of Federal land have already been included in hazardous fuel reduction projects. This project is authorized by 16 U.S.C. 7303, which established the Collaborative Forest Landscape Restoration Program, requiring all ecological restoration treatments to be conducted in accordance with "(1) the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.); (2) the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.); and (3) any other applicable law." The law prohibiting the burning of more than 20,000,000 acres of Federal land under authorized fuel reduction projects has not been repealed, and must be complied with. Furthermore, the	(153-9) See our response to letter 183.

	request for comments on the DEIS sent out by the Forest Service states that “Comments must meet the requirements of 36 CFR 218.22.” 36 CFR 218 are regulations implementing the Healthy Forests Restoration Act. The rest of that Act must be complied with, including the limit on acreage burned. “No otherwise qualified individual with a disability in the United States, as defined in section 705(20) of this title, shall, solely by reason of her or his disability… be subjected to discrimination under any program or activity conducted by any Executive agency.” 29 U.S.C. § 794(a). This project will discriminate against persons disabled with multiple chemical sensitivity (“MCS”), who cannot tolerate, or even remain in their homes, when impacted by smoke and chemical emissions from fires. The DEIS is inadequate, and in violation of the Rehabilitation Act, in wholly failing to address or even mention, let alone mitigate, impacts on persons with this	
Boyer, Jan	disability of repeated and continual burning.	(153-10) See our response to letter 183.
	The DEIS’s treatment of migratory birds on pages 239-243 is wholly inadequate, full of conclusory statements (“There would be no measurable negative effects to migratory bird populations”) that are not supported by any scientific studies, and utterly fails to address cumulative, nationwide impacts. The DEIS states that the project will kill an unspecified number of migratory birds (p. 243), and will otherwise reduce their habitat, and does not comply with the requirements of 16 U.S.C. § 704 regarding the taking and killing of such birds. E.ENDANGERED SPECIES ACT The DEIS’s treatment of endangered species is wholly inadequate, and does not comply with the requirements of 16 U.S.C. § 1539 regarding the taking of endangered species. For example, the preferred alternative proposes to burn 98 percent of protected Mexican Spotted Owl habitat within the project area, which will have “adverse effects on individual owls” (p. 181) due to fire, smoke, loss of habitat, and other project	
Boyer, Jan	activities.	(153-11) See our response to letter 183.
	All the alternatives will involve severe thinning of owl habitat, eliminating most closed canopies, when the owls required a closed canopy to reproduce. The preferred alternative proposes to burn 35,566 out of 36,455 acres of owl habit, including 6 critical habitat	
Boyer, Jan	units.	(153-12) See our response to letter 183.

Boyer, Jan	All the alternatives, says the DEIS, will increase noxious weed growth (p. 258). Not to worry, says the Forest Service: amendments 20 (Coconino NF) and 7 (Kaibab NF) have allowed the use of herbicides to control them (p. 259). But the DEIS is then required to address the massive use of herbicides that this project would entail by encouraging noxious weeds to proliferate over half a million acres of forest land, and the impacts of those herbicides on animals, plants, waterways, and humans living in and around the project area.	(153-13) See our response to letter 183.
Boyer, Jan	The DEIS (p. 174) proposes that species that need a closed canopy, including the northern goshawk, the Mexican Spotted Owl, Abert's squirrel, turkey, mule deer, black bear, and some songbird species, will all be able to flee the areas that are thinned and burned and congregate in the 17 percent of the forest that is left in closed canopy until they learn to "adjust, adapt, or eventually relocate." No science whatever is cited for this absurd and patently wrong notion that species that have never been able to survive outside of a closed canopy will learn to do so over a period of five or ten years! Nor has any thought been given as to exactly where all this wildlife are supposed to be able to "relocate" in the event that they do not in fact "adjust" or "adapt." This is why addressing cumulative, nationwide impacts is so important, and why the failure of the Forest Service to do so invalidates the DEIS. It is the policy of the Forest Service to eliminate closed canopies everywhere in the country. There simply will be nowhere for the animals (the ones that survive the initial fire-bombing) to go. If only 17 percent of the forest is left in closed canopy (p. 174), then the carrying capacity of the land will ensure that only 17 percent of those animals are left also. The stated policy of the Forest Service is to permanently thin the forest, to burn every five years to ensure that a closed canopy never returns, and to maintain such conditions at least until 2060 (p. 324). This is explicitly stated in the DEIS: "Long term (2040 to 2060), high priority strategic recommendations… include[] thinning to create a mosaic of clumps and groups of trees with intermixed openings, treating more acres with prescribed burns, and allowing more wildland fire to burn."	(153-14) See our response to letter 183.
Boyer, Jan	The stated goal of the Forest Service is to replace forests with "a mosaic of interspaces and tree groups on 41 to 44 percent of treatment acres" (p. xi), and to maintain such conditions for at least	(153-15) See our response to letter 183.

	the next fifty years.	
Boyer, Jan	All the existing literature says that between one-half of one percent and two percent of all prescribed burns escape control. The EIS must document the frequency, acreage, and intensity of escaped burns in the past, their probable frequency and extent in the future, and their impacts, especially considering the unprecedented scale of planned burning in this and other current and future projects.	(153-16) See our response to letter 183.
Boyer, Jan	Seven studies are referred to in support of the incredible claim that burning forests makes them into carbon sinks, while not burning them makes them into carbon sources. 1. Woods, K.W. et al. 2012. Carbon Commodities Funding Forest Restoration Draft Report. Prepared for M. Selig. Grand Canyon Trust.(cited on page 323) This is a draft of an unpublished report—not even a study—that is unavailable and is apparently based on Hurteau and North 2009 (below). 2. Hurteau, M. and M. North 2009. Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios. (cited on page 328) This is a study from the moist Sierra Nevada, not the dry Southwestern desert, and its conclusion at any rate is the opposite of what the DEIS claims, because the DEIS fails to consider soil carbon. "When totaled over a century and added to the wildfire emissions, total released C[arbon] was greater than in the non-burn treatments," say Hurteau and North."Current C[arbon] accounting practices can be at odds with efforts to reduce fire intensity," they say. 3. Hurteau, M. et al. The carbon costs of mitigating high-severity wildfire in southwestern ponderosa pine. Global Change Biology (2011) 17:1516-1521. (cited on p. 325) All this study claims to say is that there is 2.3 times as much carbon in our forests today than there was in 1876, and that therefore we can afford to remove half the carbon from today's forests to restore "original" conditions—a questionable conclusion based on questionable assumptions about conditions in 1876, and one that does not say that burning a forests turns it into a carbon sink. 4. Savage, M. and J.N. Mast. How resilient are southwestern ponderosa pine forests after crown fires? Canadian Journal of Forest Research 35: 967-977 (2005).(cited on p. 325) Although cited in the DEIS in support of a statement about carbon emissions, this study does not even contain the word "carbon." 5. Finkral, A.J. and A.M. Evans. The	(153-17) See our response to letter 183.

effects of a thinning treatment on carbon stocks in a northern Arizona ponderosa pine forest.Forest Ecology and Management 255 (2008) 2743-2750. (cited on p. 327) These authors actually say: "How restoration of fire-adapted forests will affect the balance of carbon stocks remains an open question." Their study area was near Flagstaff, in the region of this project, and they estimated a 2.8% annual risk of fire in the area. This is a 36-year fire rotation, contradicting the frequent-fire assumption that the Forest Service is using to justify burning the area every 5 years. 6.Neary, D.G. et al. Soil Carbon in Aris and Semiarid Forest Ecosystems, 2002. Soil carbon in arid and semiarid forest ecosystems. In: Kimble, J.M., Linda S. Heath,Richard A. Birdsey, and R. Lal, eds. The potential of U.S. forest soils to sequester carbon and mitigate the greenhouse effect. Boca Raton, FL: CRC Press: 293–310. These authors say that "there is considerable concern over the potential to quickly release large quantities of C[arbon] to the atmosphere from forest floor and biomass burning." They cite an analysis by Johnson and Curtis (2001) that "clearly shows that, in the long-term (>10 y[ears]), wildfire increases soil C[arbon] levels due to the sequestration of charcoal and recalcitrant, hydrophobic organic matter." They say: "Current forest management direction in the Intermountain West will result in far greater areas of the forests being treated with prescribed fire than was ever seen in the 20th Century. The net result will be decreases in forest floor, and aboveground biomass, and mineral soil C[arbon] pools." The results, they says, is "a net loss of C[arbon] from these ecosystems." This is all exactly the opposite of what the DEIS is claiming. 7. Wiedinmyer, C. and M.D. Hurteau. Prescribed Fire As a Means of Reducing Forest Carbon Emissions in the Western United States. Even this study does not say what the Forest Service wants it to say. These authors caution that "this work does not address important considerations such as the feasibility of implementing wide-scale prescribed fire management or the cumulative emissions from repeated prescribed burning." Not only do the cited studies not support what is claimed, but there is good science, ignored in the DEIS, saying in no uncertain terms that burning the forests contributes to climate change. Sebastiaan Luyssaert et al., Old-growth forests as global carbon sinks, Nature 455: 213-215 (2008),

	says that forests up to 800 years old, if left alone, remain net carbon sinks. Campbell, J.L. et al., Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Frontiers in Ecology and the Environment 10:83-90 (2012), concludes that ten acres must be treated with prescribed fire to prevent one acre from burning in a wildfire, and therefore that prescribed fire, if practiced on a large scale, is a significant source of carbon emissions contributing to climate change. On page v, the DEIS says that Alternative C responded to public concern about preserving large trees. Yet Alternative C would remove trees up to 18 inches in diameter, compared to only 16 inches in the other alternatives. It would also burn more acres and mechanically thin more acres than the other alternatives. On page iii, it is said that more trees means "reduced ground cover," causing springs to dry up. But trees and their roots are ground cover and hold moisture. Removing them will cause springs to dry up, just the opposite of what it says in the DEIS. The DEIS goes so far as to say that closed forest canopies increase evaporation from trees (p. 111), drying out the forest. In other words, black is white. The truth is that "Removing canopy trees leads to a hotter, drier, windier microclimate." (William L. Baker, Forest Ecology in Rocky Mountain Landscapes, Island Press, Washington, D.C., 2009, p. 373).Thinning closed-canopy forests leads to higher fire intensity because of lower fuel moisture and higher wind speed. (R.V. Platt et al. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Association of American Geographers 96:455-70 (2006). Removing half the volume of a western white pine stand in northern Idaho lowered fuel moisture by about one-third (L.G. Hornby. Fuel type mapping in Region One. Journal of Forestry 33:67-71 (1935), increased wind speed six- to ten-fold, and increased the number of critical fire days four-fold (G.M. Jemison. The significance of the effect of stand density upon the weather beneath the canopy. Journal of Forestry 32:446-51 (1934)). No published science supports the Forest Service's misguided opinion. The only study cited in the DEIS for this is J.M. Bosch and J.D. Hewlett, A review of catchment experiments to determine the	
Boyer, Jan	effect of vegetation of vegetation changes on water yield and	(153-18) See our response to letter 183.

	evapotranspiration, Journal of Hydrology 55:3-23 (1982). This is a study of catchments, i.e. how much water collects in reservoirs in forested versus denuded areas. In densely forested land, most rainfall is absorbed into the ground and the vegetation. In clearcut areas, all the water runs off into the streams and reservoirs, filling them up. The forest dries out, and the reservoirs fill up.	
Boyer, Jan	On page xi, purpose number 4 of the project is to "reduce[e] stand density" in goshawk and spotted owl habitat, even elsewhere it is stated that these species depend on dense forests for their survival.	(153-19) See our response to letter 183.
Boyer, Jan	On page xii, it is said that although Abert's squirrel and tassel-eared squirrel habitat will be diminished in the short term, it will be increased in the long term. This contradicts what is said on page xi, i.e. that closed canopy conditions will never (at least not before 2050) be permitted to return.	(153-20) See our response to letter 183.
Boyer, Jan	On page xii, it is said there will be "no measurable effects to migratory bird populations." This defies common sense. Inevitably, birds will be killed by fire. Converting half the forest to meadows will diminish their habitat. On page xii, it is said that "important bird areas" will "benefit" from the project, which contradicts what is said in Appendix G, i.e. that some song birds will need "bridge habitat" to survive at all.	(153-21) See our response to letter 183.
Boyer, Jan	On page xii, it is said that "individual tree growth would improve, increase[ing] carbon storage over time." This contradicts page xi, which implies that up to half the biomass in the forest will be removed permanently (or at least until 2050) and not be allowed to grow back.	(153-22) See our response to letter 183.
Boyer, Jan	On page 180, it is said that "Canopy cover in habitat selected by M[exican] S[potted] O[wl] is higher than the average forest values and can range from 50 percent to greater than 80 percent. There is decreased quality in prey habitat due in part to uncharacteristic canopy connectivity from ingrowth of smaller trees inhibiting herbaceous understory development." This passage contradicts itself. Is the Forest Service really saying that the stupid spotted owl doesn't know what is good for it, and is idiotically choosing these closed canopy forests even though they are bad for it?	(153-23) See our response to letter 183.
Boyer, Jan	On page 180, it is said that in the no-action alternative, "understory development would remain suppressed and continue to decline."	(153-24) See our response to letter 183.

Boyer, Jan	This contradicts page 187, which emphasizes that “ladder fuels,” i.e. understory development, need to be eliminated. Which is it? Is there too much or too little understory development under current conditions?	
Boyer, Jan	On page 181, it is stated that impacts on spotted owls will be mitigated because “not all MSO habitats are treated simultaneously.” This is contradicted by page vi, which states that every area will be treated every five years—practically simultaneous, when it comes to destruction of habitat. On page 181, it is stated that spotted owls will be protected by “retaining dense stands with closed canpies,” contradicting what was just said on page 180 about the need to thin out the canopy for the spotted owls’ welfare.	(153-25) See our response to letter 183.
Boyer, Jan	On page 182, it is said that “all alternatives would increase trees greater than 18 inches d.b.h.” How? If the plan is to remove all trees smaller than 18 inches, the number of trees greater than 18 inches is not going to increase.	(153-26) See our response to letter 183.
Boyer, Jan	On page 182, it is said that “Ponderosa pine basal area would decrease in all action alternatives, which is a treatment objective.” But Ponderosa pine is the largest and most common tree in the project area. If the goal is to decrease the biomass contained in Ponderosas, and since smaller trees will never have as much biomass, then the goal of the project is to decrease carbon storage in the forest, which contradicts the entire discussion about carbon and climate change.	(153-27) See our response to letter 183.
Boyer, Jan	On page 183, it is said that snags greater than 18 inches would decrease under alternatives B, C, and D, contradicting what was said on page 180, i.e. that the project would increase the amount of snags, benefiting wildlife.	(153-28) See our response to letter 183.
Boyer, Jan	This DEIS appears to be simply a pro forma rationalization for a foregone conclusion. The Forest Service is not ashamed to fill its statutorily required document with absurd, contradictory statements unjustified by science that defy common sense in order to get on with a project that will benefit the wood products industry but no one else. The DEIS satisfies neither the letter nor the spirit of the National Environmental Quality Act. Alternative A, no action, is the only alternative action that is justified, and should be the one chosen.	(153-29) See our response to letter 183.

Boyer, Jan	These comments are submitted in response to the March 29, 2013 notice in the Federal Register, 78 FR 19261, requesting public comment before May 29, 2013 on EIS No. 20130076, the Draft Environmental Impact Statement ("DEIS") for the Four Forests Restoration Initiative ("4FRI"). These comments are submitted in accordance with the agency's obligations under the National Environmental Policy Act's ("NEPA") regulations at 40 C.F.R. § 1503.1(a)(4). In accordance with 40 CFR 1503.3(a), they address both the adequacy and the merits of the DEIS.	(122-3) Thank you for your comments. We received more than one letter that was an exact duplicate of version you submitted (a form letter). Please see our responses to letter 183.
Boyer, Jan	2. 40 CFR 1502.16(h) The DEIS must include "means to mitigate adverse environmental impacts—here, impacts on these sensitive populations. The DEIS may not just say there will be impacts without saying how they will be mitigated. 3.40 CFR 1502.14(f) Regarding these sensitive populations, The DEIS must, but does not, "include appropriate mitigation measures not already included in the proposed action or alternatives." 4. 42 USC 4332(C)(iv) The EIS must include information on "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity."This project will convert forests into "groups of trees mixed with interspaces" by permanently removing around half the biomass of the project area, providing enormous quantities of wood products during the first ten years. Obviously such productivity cannot be sustained. The DEIS does not provide the required information about how this will enhance long-term productivity. 5.40 CFR 1508.7, 40 CFR 1508.25(a)(2), 40 CFR 1508.25(c), 40 CFR 1508.27(b)(7). These sections all require consideration of cumulative impacts and prohibit segmentation, i.e. breaking a large action "into small component parts." The DEIS addresses only cumulative impacts of actions within the Coconino and Kaibab National Forests, but not the cumulative impact of all of the actions in the Collaborative Forest Landscape Restoration Program. Each of the individual projects in the program is a "small component part" of the whole program, with cumulative impacts on climate change, air quality, public health, migrating birds, threatened and endangered species, and other environmental factors. The Forest Service is ignoring these cumulative, nationwide impacts through illegal segmentation. 6.40 CFR 1502.24, "METHODOLOGY	(122-4) See responses in letter 183.

AND SCIENTIFIC ACCURACY" "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." This DEIS is in flagrant violation of scientific integrity and accuracy. The DEIS references numerous scientific studies in support of conclusions that those studies do not support, and even contradict. The DEIS is internally inconsistent, self-contradictory, and full of completely outlandish statements. B.HEALTHY FORESTS RESTORATION ACT OF 2003 "Not more than a total of 20,000,000 acres of Federal land may be treated under authorized hazardous fuel reduction projects." 16 U.S.C. § 6512(c). Since the passage of this Act, about 20,000,000 acres of Federal land have already been included in hazardous fuel reduction projects. This project is authorized by 16 U.S.C. 7303, which established the Collaborative Forest Landscape Restoration Program, requiring all ecological restoration treatments to be conducted in accordance with "(1) the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.); (2) the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.); and (3) any other applicable law." The law prohibiting the burning of more than 20,000,000 acres of Federal land under authorized fuel reduction projects has not been repealed, and must be complied with. Furthermore, the request for comments on the DEIS sent out by the Forest Service states that "Comments must meet the requirements of 36 CFR 218.22." 36 CFR 218 are regulations implementing the Healthy Forests Restoration Act. The rest of that Act must be complied with, including the limit on acreage burned.

C.REHABILITATION ACT OF 1973 "No otherwise qualified individual with a disability in the United States, as defined in section 705(20) of this title, shall, solely by reason of her or his disability… be subjected to discrimination under any program or activity conducted by any Executive agency." 29 U.S.C. § 794(a). This project will discriminate against persons disabled with multiple chemical sensitivity ("MCS"), who cannot tolerate, or even remain in their homes, when impacted by smoke and chemical emissions from fires.The DEIS is inadequate, and in violation of the Rehabilitation Act, in wholly failing to address or even mention, let alone mitigate, impacts on persons with this

Boyer, Jan disability of repeated and continual burning. D.MIGRATORY BIRD

(122-5) See responses in letter 183.

TREATY, 16 U.S.C., CHAPTER 7 The DEIS's treatment of migratory birds on pages 239-243 is wholly inadequate, full of conclusory statements ("There would be no measurable negative effects to migratory bird populations") that are not supported by any scientific studies, and utterly fails to address cumulative, nationwide impacts. The DEIS states that the project will kill an unspecified number of migratory birds (p. 243), and will otherwise reduce their habitat, and does not comply with the requirements of 16 U.S.C. § 704 regarding the taking and killing of such birds. E.ENDANGERED SPECIES ACT The DEIS's treatment of endangered species is wholly inadequate, and does not comply with the requirements of 16 U.S.C. § 1539 regarding the taking of endangered species. For example, the preferred alternative proposes to burn 98 percent of protected Mexican Spotted Owl habitat within the project area, which will have "adverse effects on individual owls" (p. 181) due to fire, smoke, loss of habitat, and other project activities. II.ALTERNATIVES B, C, AND D WILL BE DISASTROUS FOR MEXICAN SPOTTED OWLS. All the alternatives will involve severe thinning of owl habitat, eliminating most closed canopies, when the owls required a closed canopy to reproduce. The preferred alternative proposes to burn 35,566 out of 36,455 acres of owl habit, including 6 critical habitat units. III.THE DEIS FAILS TO ADDRESS THE IMPACT OF HERBICIDES All the alternatives, says the DEIS, will increase noxious weed growth (p. 258). Not to worry, says the Forest Service: amendments 20 (Coconino NF) and 7 (Kaibab NF) have allowed the use of herbicides to control them (p. 259). But the DEIS is then required to address the massive use of herbicides that this project would entail by encouraging noxious weeds to proliferate over half a million acres of forest land, and the impacts of those herbicides on animals, plants, waterways, and humans living in and around the project area. IV.THE DISCUSSION OF "BRIDGE HABITAT" IS INADEQUATE AND INCOMPREHENSIBLE The DEIS (p. 174) proposes that species that need a closed canopy, including the northern goshawk, the Mexican Spotted Owl, Abert's squirrel, turkey, mule deer, black bear, and some songbird species, will all be able to flee the areas that are thinned and burned and congregate in the 17 percent of the forest that is left in closed canopy until they learn to "adjust, adapt, or eventually relocate." No science whatever is cited

for this absurd and patently wrong notion that species that have never been able to survive outside of a closed canopy will learn to do so over a period of five or ten years! Nor has any thought been given as to exactly where all this wildlife are supposed to be able to "relocate" in the event that they do not in fact "adjust" or "adapt." This is why addressing cumulative, nationwide impacts is so important, and why the failure of the Forest Service to do so invalidates the DEIS. It is the policy of the Forest Service to eliminate closed canopies everywhere in the country. There simply will be nowhere for the animals (the ones that survive the initial fire-bombing) to go. If only 17 percent of the forest is left in closed canopy (p. 174), then the carrying capacity of the land will ensure that only 17 percent of those animals are left also. The stated policy of the Forest Service is to permanently thin the forest, to burn every five years to ensure that a closed canopy never returns, and to maintain such conditions at least until 2060 (p. 324). This is explicitly stated in the DEIS: "Long term (2040 to 2060), high priority strategic recommendations… include[] thinning to create a mosaic of clumps and groups of trees with intermixed openings, treating more acres with prescribed burns, and allowing more wildland fire to burn." The stated goal of the Forest Service is to replace forests with "a mosaic of interspaces and tree groups on 41 to 44 percent of treatment acres" (p. xi), and to maintain such conditions for at least the next fifty years. V.THE DEIS DOES NOT ADDRESS THE IMPACT OF ESCAPED PRESCRIBED BURNS. All the existing literature says that between one-half of one percent and two percent of all prescribed burns escape control. The EIS must document the frequency, acreage, and intensity of escaped burns in the past, their probable frequency and extent in the future, and their impacts, especially considering the unprecedent scale of planned burning in this and other current and future projects.

VI. THE CONCLUSIONS ABOUT CARBON AND CLIMATE CHANGE ARE CONTRARY TO COMMON SENSE AND CONTRADICTED BY THE SCIENCE CITED Seven studies are referred to in support of the incredible claim that burning forests makes them into carbon sinks, while not burning them makes them into carbon sources. 1. Woods,

Boyer, Jan K.W. et al. 2012. Carbon Commodities Funding Forest Restoration (122-6) See the responses in letter 183.

Draft Report. Prepared for M. Selig. Grand Canyon Trust. (cited on page 323) This is a draft of an unpublished report—not even a study—that is unavailable and is apparently based on Hurteau and North 2009 (below). 2. Hurteau, M. and M. North 2009. Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios. (cited on page 328) This is a study from the moist Sierra Nevada, not the dry Southwestern desert, and its conclusion at any rate is the opposite of what the DEIS claims, because the DEIS fails to consider soil carbon. "When totaled over a century and added to the wildfire emissions, total released C[arbon] was greater than in the non-burn treatments," say Hurteau and North. "Current C[arbon] accounting practices can be at odds with efforts to reduce fire intensity," they say. 3. Hurteau, M. et al. The carbon costs of mitigating high-severity wildfire in southwestern ponderosa pine. Global Change Biology (2011) 17:1516-1521. (cited on p. 325) All this study claims to say is that there is 2.3 times as much carbon in our forests today than there was in 1876, and that therefore we can afford to remove half the carbon from today's forests to restore "original" conditions—a questionable conclusion based on questionable assumptions about conditions in 1876, and one that does not say that burning a forests turns it into a carbon sink. 4. Savage, M. and J.N. Mast. How resilient are southwestern ponderosa pine forests after crown fires? Canadian Journal of Forest Research 35: 967-977 (2005). (cited on p. 325) Although cited in the DEIS in support of a statement about carbon emissions, this study does not even contain the word "carbon." 5. Finkral, A.J. and A.M. Evans. The effects of a thinning treatment on carbon stocks in a northern Arizona ponderosa pine forest. Forest Ecology and Management 255 (2008) 2743-2750. (cited on p. 327) These authors actually say: "How restoration of fire-adapted forests will affect the balance of carbon stocks remains an open question." Their study area was near Flagstaff, in the region of this project, and they estimated a 2.8% annual risk of fire in the area. This is a 36-year fire rotation, contradicting the frequent-fire assumption that the Forest Service is using to justify burning the area every 5 years. 6. Neary, D.G. et al. Soil Carbon in Aris and Semiarid Forest Ecosystems, 2002. Soil carbon in arid and semiarid forest ecosystems. In: Kimble, J.M.,

Linda S. Heath,Richard A. Birdsey, and R. Lal, eds. The potential of U.S. forest soils to sequester carbon and mitigate the greenhouse effect. Boca Raton, FL: CRC Press: 293–310. These authors say that "there is considerable concern over the potential to quickly release large quantities of C[arbon] to the atmosphere from forest floor and biomass burning." They cite an analysis by Johnson and Curtis (2001) that "clearly shows that, in the long-term (>10 y[ears]), wildfire increases soil C[arbon] levels due to the sequestration of charcoal and recalcitrant, hydrophobic organic matter." They say: "Current forest management direction in the Intermountain West will result in far greater areas of the forests being treated with prescribed fire than was ever seen in the 20th Century. The net result will be decreases in forest floor, and aboveground biomass, and mineral soil C[arbon] pools." The results, they says, is "a net loss of C[arbon] from these ecosystems." This is all exactly the opposite of what the DEIS is claiming. 7. Wiedinmyer, C. and M.D. Hurteau. Prescribed Fire As a Means of Reducing Forest Carbon Emissions in the Western United States. Even this study does not say what the Forest Service wants it to say. These authors caution that "this work does not address important considerations such as the feasibility of implementing wide-scale prescribed fire management or the cumulative emissions from repeated prescribed burning." Not only do the cited studies not support what is claimed, but there is good science, ignored in the DEIS, saying in no uncertain terms that burning the forests contributes to climate change. Sebastiaan Luyssaert et al., Old-growth forests as global carbon sinks, Nature 455: 213-215 (2008), says that forests up to 800 years old, if left alone, remain net carbon sinks. Campbell, J.L. et al., Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Frontiers in Ecology and the Environment 10:83-90 (2012), concludes that ten acres must be treated with prescribed fire to prevent one acre from burning in a wildfire, and therefore that prescribed fire, if practiced on a large scale, is a significant source of carbon emissions contributing to climate change.

VI. THE DEIS IS SELF-CONTRADICTORY On page v, the DEIS says that Alternative C responded to public concern about preserving large

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trees. Yet Alternative C would remove trees up to 18 inches in

(122-7) See the responses in letter 183.

diameter, compared to only 16 inches in the other alternatives. It would also burn more acres and mechanically thin more acres than the other alternatives. On page iii, it is said that more trees means "reduced ground cover," causing springs to dry up. But trees and their roots are ground cover and hold moisture. Removing them will cause springs to dry up, just the opposite of what it says in the DEIS. The DEIS goes so far as to say that closed forest canopies increase evaporation from trees (p. 111), drying out the forest. In other words, black is white. The truth is that "Removing canopy trees leads to a hotter, drier, windier microclimate." (William L. Baker, Forest Ecology in Rocky Mountain Landscapes, Island Press, Washington, D.C., 2009, p. 373). Thinning closed-canopy forests leads to higher fire intensity because of lower fuel moisture and higher wind speed. (R.V. Platt et al. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Association of American Geographers 96:455-70 (2006). Removing half the volume of a western white pine stand in northern Idaho lowered fuel moisture by about one-third (L.G. Hornby. Fuel type mapping in Region One. Journal of Forestry 33:67-71 (1935), increased wind speed six- to ten-fold, and increased the number of critical fire days four-fold (G.M. Jemison. The significance of the effect of stand density upon the weather beneath the canopy. Journal of Forestry 32:446-51 (1934)). No published science supports the Forest Service's misguided opinion. The only study cited in the DEIS for this is J.M. Bosch and J.D. Hewlett, A review of catchment experiments to determine the effect of vegetation of vegetation changes on water yield and evapotranspiration, Journal of Hydrology 55:3-23 (1982). This is a study of catchments, i.e. how much water collects in reservoirs in forested versus denuded areas. In densely forested land, most rainfall is absorbed into the ground and the vegetation. In clearcut areas, all the water runs off into the streams and reservoirs, filling them up. The forest dries out, and the reservoirs fill up. On page xi, purpose number 4 of the project is to "reduce[e] stand density" in goshawk and spotted owl habitat, even elsewhere it is stated that these species depend on dense forests for their survival. On page xii, it is said that although Abert's squirrel and tassel-eared squirrel habitat will be diminished in the short term, it

will be increased in the long term. This contradicts what is said on page xi, i.e. that closed canopy conditions will never (at least not before 2050) be permitted to return. On page xii, it is said there will be "no measurable effects to migratory bird populations." This defies common sense. Inevitably, birds will be killed by fire. Converting half the forest to meadows will diminish their habitat. On page xii, it is said that "important bird areas" will "benefit" from the project, which contradicts what is said in Appendix G, i.e. that some song birds will need "bridge habitat" to survive at all. On page xii, it is said that "individual tree growth would improve, increase[ing] carbon storage over time." This contradicts page xi, which implies that up to half the biomass in the forest will be removed permanently (or at least until 2050) and not be allowed to grow back. On page 180, it is said that "Canopy cover in habitat selected by M[exican] S[potted] O[wl] is higher than the average forest values and can range from 50 percent to greater than 80 percent. There is decreased quality in prey habitat due in part to uncharacteristic canopy connectivity from ingrowth of smaller trees inhibiting herbaceous understory development." This passage contradicts itself. Is the Forest Service really saying that the stupid spotted owl doesn't know what is good for it, and is idiotically choosing these closed canopy forests even though they are bad for it? On page 180, it is said that in the no-action alternative, "understory development would remain suppressed and continue to decline." This contradicts page 187, which emphasizes that "ladder fuels," i.e. understory development, need to be eliminated. Which is it? Is there too much or too little understory development under current conditions? On page 181, it is stated that impacts on spotted owls will be mitigated because "not all MSO habitats are treated simultaneously." This is contradicted by page vi, which states that every area will be treated every five years—practically simultaneous, when it comes to destruction of habitat. On page 181, it is stated that spotted owls will be protected by "retaining dense stands with closed canpies," contradicting what was just said on page 180 about the need to thin out the canopy for the spotted owls' welfare. On page 182, it is said that "all alternatives would increase trees greater than 18 inches d.b.h." How? If the plan is to remove all trees smaller than 18 inches, the

	number of trees greater than 18 inches is not going to increase. On page 182, it is said that "Ponderosa pine basal area would decrease in all action alternatives, which is a treatment objective." But Ponderosa pine is the largest and most common tree in the project area. If the goal is to decrease the biomass contained in Ponderosas, and since smaller trees will never have as much biomass, then the goal of the project is to decrease carbon storage in the forest, which contradicts the entire discussion about carbon and climate change. On page 183, it is said that snags greater than 18 inches would decrease under alternatives B, C, and D, contradicting what was said on page 180, i.e. that the project would increase the amount of snags, benefiting wildlife. This DEIS appears to be simply a pro forma rationalization for a foregone conclusion. The Forest Service is not ashamed to fill its statutorily required document with absurd, contradictory statements unjustified by science that defy common sense in order to get on with a project that will benefit the wood products industry but no one else. The DEIS satisfies neither the letter nor the spirit of the National Environmental Quality Act. Alternative A, no action, is the only alternative action that is justified, and should be the one	
Boyer, Jan	chosen. This letter provides comment from the Center for Biological Diversity, Grand Canyon Wildlands Council, Great Old Broads for Wilderness, the Sierra Club, and the White Mountain Conservation League regarding the Draft Environmental Impact Statement ("DEIS") on activities connected to the Four Forest Restoration Initiative ("4FRI" or "project") in the Coconino and Kaibab National Forests. This comment is timely because the notice of availability published in the Federal Register states that the comment period shall end on	(122-8) See responses in letter 183.
Burke, Kelly	May 29, 2013. See 78 Fed. Reg. 19261 (Mar. 29, 2013). Please find attached to this message and pasted below a letter from five conservation organizations commenting on the Draft Environmental Impact Statement for activities connected to the Four Forest Restoration Initiative in the Coconino and Kaibab National Forests. All attachments described in the comment letter are	(Letter 197) Please see our response to letter 196.
Burke, Kelly	embedded in the PDF document.	(197-2) Please see our response to letter 196.
Busby, Brad	The alternatives described may include the use of prescribed fire,	(156-1) Thank you for your comments. In response to comments on the

amongst other methods, to achieve land management objectives throughout much of the project area. As you are aware, prescribed fire creates smoke that includes a complex mix of air pollutants. Prescribed fire planning must consider the effects of smoke on sensitive areas and address potential impacts of smoke on air quality and the public in terms of health, nuisance, and visibility.

DEIS, we have clarified that mitigation and design features would be used to reduce emissions from prescribed fire including:(1) Reducing the emissions produced for a given area treated, (2) Redistributing/ diluting the emissions through meteorological scheduling and by coordinating with other burners in the airshed. Dilution involves controlling the rate of emissions or scheduling for dispersion to assure tolerable concentrations of smoke in designated areas, and (3) Avoidance uses meteorological conditions when scheduling burning in order to avoid incursions of wildland fire smoke into smoke sensitive areas (DEIS, FE9, page 570). Prescribed fire (pile, broadcast, and jackpot burning) would occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. Coordination with ADEQ would take place through the Kaibab and Coconino NF Zone Dispatch Center and the prescribed fire Burn Boss (DEIS, FE2, page 568). Emission reduction techniques (ERTs) that are recommended by Arizona ADEQ would be utilized when possible to minimize impacts to sensitive receptors (including communities) of burn unit(s) (DEIS, FE3, page 568). The following ERTs would be used when practicable to minimize impacts to sensitive receptors: pre-burn fuel removal, mechanical processing, increased burning frequency, aerial/mass ignition, high moisture in large fuels, rapid mop up, air curtain incinerators, burn before greenup, backing fire, maintain fire line intensity, underburn before litterfall, isolating fuels, concentrating fuels, mosaic/jackpot burning, moist litter and duff, burn before large activity fuels cure, and utilize piles (DEIS, FE8, page 569). In addition to prescribed fire, the 4FRI is proposing over 388,000 acres of mechanical treatments (DEIS page 40). On the majority of these acres, there would be little slash available for burning which means reduced emissions. Appendix C of the FEIS contains the project design features, best management practices, and mitigation measures that will be employed during implementation of the 4FRI treatments. The Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan (appendix E) in the FEIS has been expanded and contains specific language addressing how the preferred alternative will help build the resilience of the ponderosa pine ecosystem to the predicted effects of climate change. The Fire Ecology report for the FEIS states (for alternative C) that “However, after the first entry burn, fuel loads would be significantly decreased, so potential

		tons/acre of emissions would be significantly lower. Additionally, because of the decrease in fuels, fire behavior potential would also be significantly lower (Table 134), so there would be more potential to burn on days with better smoke dispersal (higher winds and more lift).
Busby, Brad	The project area is large, encompassing many smoke sensitive communities, with some proposed burn areas located near Class I Areas. Clean Air Act (CAA) requirements include the protection of visibility in Class I Areas and avoidance of violations of the National Ambient Air Quality Standards. All Prescribed fire projects must also comply with the requirements of Arizona Administrative Code R18-2-1501 through 1515, Forest and Range Management Burns. These are rules which manage for smoke emissions that are produced from prescribed fire activities in Arizona.	(156-2) Thank you for your comments. The project will be implemented in compliance with National Ambient Air Quality Standards and comply with the requirements of Arizona Administrative Code R18-2-1501 through 1515, Forest and Range Management Burns.
Busby, Brad	In addition to these initial measures for air quality, we appreciate your willingness to work within the Arizona Enhanced Smoke Management Program. We encourage you to actively pursue any emission reduction techniques that can be utilized to mitigate smoke emissions. These techniques should be included in future analyses as measures that will be used to help reduce impacts on air quality. Conducting burns using aerial ignition, burning in a mosaic pattern, isolating fuels, burning before green-up, and using backing fire are just some of the techniques commonly used to reduce emissions from prescribed burns. Additionally, it is always helpful to do a public notification for smoke-sensitive individuals prior to burning as a way to address the public's potential smoke concerns.	(156-3) Thank you for your recommendations and working with us throughout the analysis to include ways to reduce emissions from prescribed fire.
Busby, Brad	Please contact me if I can be of any assistance or clarify any of the above statements.	(156-4) Thank you your comments and we will continue to work with AZ ADEQ through implementation.
Busby, Bradley	In reading the Draft EIS and preparing my comments, I keep getting referred to the Fire Ecology, Fuels and Air Quality Specialist Report. None of the Specialist Reports links are functional on the http://www.fs.usda.gov/main/4fri/planning website. Can I please get an electronic copy of the Fire, Ecology, Fuels and Air Quality Specialist report?	(135-1) This is a request for electronic copies of the specialists' reports. It was addressed.
Bush Baum, Scott	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI)	Thank you for your comment. Please see our response to Letter #19.

and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Causer, Richard	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture,	Thank you for your comment. Please see our response to Letter #19.

Chase, Deborah	habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these	(53-1) Thank you for your comments. Please see our response to letter #19.

national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected,

chow, sun

(120-1) Thank you for your comment. Please see our response to letter #19.

	with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Chrisman, B.	The Draft EIS for the 4FRI proposes four alternatives and unfortunately these immediately slant all comments you receive, because the first alternative - do nothing - is unlikely to be chosen by responsible citizens who wish to improve our forests, and meanwhile the other three all include extensive prescribed burns. Thus, the choices press commentary where the Forest Service wants to go. Quite honestly, not a fair survey of comments.	(117-1) Thank you for your comment. See our response to letter #6, #11 and #74.
Chrisman, B.	Only the air is no longer clean and smoke hangs in this well populated valley for days or weeks at a time. As both a Physician and significantly affected citizen who expects to live out the rest of my life here, I support any effort to improve the forests while stating that we humans are just as much a part of Nature as are birds, elk, or trees. What happens in the forests affects us whether we live in it or not. Prescribed burns, likely to go on for a decade and more if current Forest Service plans proceed, will adversely affect the health of a great many people, both young, old, and even the as-yet unborn. This includes Forest Service personnel and their children or grandchildren. Some people will be affected very seriously indeed.	(117-2) Thank you for your comments. Please see our responses to letter #6, #11 and #74.
Chrisman, B.	Thus, alternatives to prescribed burns can and must be found.	(117-3) Thank you for your comment. Please see our response to letter #6, #11 and #74.
Chrisman, B.	I would support any of the Forest Service alternatives that do something, but WITHOUT prescribed burns.	(117-4) Thank you for your position.
Clair, Laura	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I	Thank you for your comment. Please see our response to Letter #19.

have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact

	Statement for the 4FRI project. Staff from the Arizona Elk Society has reviewed the Draft Environmental Statement for the Four Forest Restoration Initiative and we find the document to be well written and provides a pathway to lessoning the potential for catastrophic fires that reduce wildlife habitat to ashes as we have seen so many times. Having participated in the Stakeholders Group it is clear that the document represents as compromise in many respects, but the compromises are necessary to make progress to restoring wildlife habitat and forest health to pre-settlement conditions. In reviewing the document both Alternative B and C are acceptable to the Arizona Elk Society as they both move toward restoring forest health in a timely fashion but we recommend the Preferred Alternative. We are particularly supportive of the proposed work on improving wetland and spring habitats. Small in size but these habitats are incredibly important to a host of wildlife	
Clark, Steve	species.	(181-1) Thank you for taking the time to review and comment on the DEIS.
	1. There are several references to closing forest roads, an issue that we have commented on several times in the development of the Travel Management Rule. In reading the DEIS, it is unclear to us if the road closures are additive to those proposed under TMR or if this is road closures addressed in TMR. If this is additional closures, the membership of the AES is adamantly opposed to additional closures.	(181-2) Thank you for your comment. Page 28 of the DEIS states "The TMR process identified a need to decommission approximately 770 miles of existing system and unauthorized roads on the Coconino NF. On the Kaibab NF, approximately 134 miles of unauthorized roads (often referred to as user-created routes) were recommended for decommissioning." These are the only roads proposed for decommissioning/closing. The 4FRI DEIS is solely disclosing the effects of closing roads that have been outlined the each Forests respective TMR decisions. There are no additive roads proposed for closure or decommissioning.
Clark, Steve	Please clarify this issue in the final EIS.	
	2. We strongly support the effort at grassland restoration. The AES and other Wildlife Conservation Organizations have actively been working to restore this important habitat and believe it is a progressive step to include this in the final EIS. Grasslands are critical winter habitat to a number of wildlife species. Further, there are many species that are obligate to an intact grassland and these	
Clark, Steve	species are quickly lost as woody species invade this habitat type.	(181-3) Thank you for your support.
	3. The concept of adaptive management is stressed in the DEIS but to effectively use this management concept, it is critical to monitor ecological responses to the different treatments in order to fully use	(181-4) Monitoring is part of the adapted management process for this project. Appendix E has been updated in the FEIS and establishes the monitoring criteria that would be used to determine if the project is meeting the desired conditions as outlined in Chapter 1.
Clark, Steve	the information generated by different treatments as the project	

	progresses. Often, restoration focuses on treatments and monitoring is poorly funded. For adaptive management to be meaningful, it is critical to provide funding for monitoring natural resource responses to treatments.	
Clark, Steve	We have read the Wildlife Specialist Report and agree with most of the information presented there, however, feel that the statements that hunting in the most influential factor in determining pronghorn, mule deer, and elk numbers in the forests is misleading. While elk are generalists and populations do well in a variety of conditions, we feel that grassland degeneration has had and will continue to have dramatic adverse impacts on pronghorn. Mule deer are dependent on early successional serial stages and as the forest as became overgrown with conifers, the habitat quality has dramatically declined. Hunting does not regulate these populations, habitat conditions do and the final EIS should be reworded to accurately portray the impact of habitat declines on both pronghorn and mule deer. While elk are generalists, habitat conditions have also declined for this species as well. Meadows have been invaded by conifers, proliferation of conifers has resulted in a drier forest with reduced forage for elk. Better forest conditions will result from forest restoration independent of harvest of these species. Habitat quality and quantity is the key for managing wildlife populations with hunting being a tool, but without adequate habitat, wildlife populations are in jeopardy.	(181-5) The section of the wildlife specialist report that the commenter is referring to is the Management Indicator Species section, pages 431-440. The specialist report does evaluate the effects of forest treatments on habitat quality for elk (pages 430-431), mule deer (pages 435-437) and pronghorn (pages 438-440). The analysis did not just rely on the fact that hunting has an important influence on these species. Each species and the habitat they are an indicator for was reviewed to determine how each alternative would impact forestwide habitat and population trends. For example here is the summary for Alternative C for the Kaibab NF on pronghorn: Alternative C would change the forestwide grassland habitat trend to increasing in both short and long term. This is due to the removal of trees in current grasslands and the restoration of historical grasslands. The alternative would have the pronghorn forestwide population trend as stable to increasing. There would be an improvement in pronghorn habitat connectivity within forested areas and prescribed fire would increase diversity and productivity of herbaceous plants, will improving foraging and fawning habitat for pronghorn. However, the forestwide population trends for pronghorn are largely influenced by hunting, drought, and loss of connectivity due to human development. For these three species, the wildlife biologists worked closely with the Arizona Game and Fish Department habitat specialist. It was Arizona Game and Fish who noted that hunting is one of the primary activities for establishing population trends. Hunt structures are designed to increase, decrease, or maintain a stable population trend depending on the state agency population goals. Also note as shown above in the summary for Alternative C, hunting was not the only stated outside influence on the forestwide pronghorn population trends.
Clark, Steve	It is important to point out that there are references such as on page 291 that indicate that there will be positive impacts from road closures but this concept is not universally accepted. The forests should be managed for multiple recreational pursuits. It is important that the final EIS be reworded to indicate that some forest users see	(181-6) Please see our previous response on the scope of this analysis as it relates to a designated transportation system.

Conwell, Douglas	benefit from road closures but many others find this a needless burden on their use and enjoyment of our national forests. In conclusion, the Arizona Elk Society endorses the Preferred Alternative as outlined in the DEIS and believe that continued open and transparent collaboration with the Stakeholder Group and the American public is essential for making progress in resetting the environmental clock to the point where our forests are once again healthy and not at great risk for stand-converting fires. The cost of this project will be the loss of habitat, loss of carbon storage, loss of forests to refresh the spirit and purify the air. It is the lives of all the birds and animals who are killed. It is the loss not only of our health but of our children's ability to experience nature. Not only will the fires kill almost all the animals in their paths, it will drastically reduce the habitat for those that survive. This project is so big that I understand that the Forest Service has been forced to admit that it will be up to ten years before most of the million acres will again be habitable by brown bears, squirrels, and song birds.	(104-1) Thank you for your comment. Please see the purpose and need for this restoration project as stated in the DEIS on page 8.
Conwell, Douglas	The project in Arizona will burn 32 tons of potassium permanganate. Researchers Sandra Steingraber, Martha Herbert, Gabor Mate and others say potassium permanganate and the other poisons used in these projects, including herbicides, are implicated in ADD, autism, miscarriages, and cancer.	
Conwell, Douglas	Although the purported aim of the Forest Service is to thin the forests to reduce the risk of fire, scientists at Oregon State University published a paper in 2012 stating that you have to thin ten acres of forest to prevent loss of one acre to a wildfire. Their conclusion is that the Forest Service's thinning and burning programs are adding massively to global warming.	
Conwell, Douglas	The Forest Service is required to collaborate with the public, but the only "collaborators" I know of are receiving grants or wood,--before the Forest Service burns the land, it invites commercial loggers in to harvest the trees-- so they should be called business partners, not citizen collaborators.	(104-4) The 4FRI stakeholders group has been involved with this project since 2009 and their input has been integral to collaboratively developing the multi-party monitoring board and the suite of questions to be answered with monitoring. In addition, workshops open to the public were held during scoping and after the DEIS was published to answer questions and take comments.
Conwell, Douglas	There are many other alternative actions that would accomplish the stated purposes. We can have local wood harvesting co-ops like most countries do. We can educate homeowners to clear a defensible space around buildings, instead of clearing the entire forest. The Forest Service should preserve trees on steep slopes so all the dirt doesn't fall off. They should save the big old trees. They should commit to zero use of carcinogens. They could obey the law about songbird and spotted owl protection, wilderness protection, and about notifying us, correctly, of their plans, and about meeting locations and times.	
Conwell, Douglas	Please stop this Initiative and stand back, truly involve the public in a meaningful dialogue and look at alternatives.	
Cook, Eryn	Please accept these comments on the Four Forests Restoration	(56-1) Thank you for your comments. Please see our response to letter

Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially

#19.

	important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Cote, Paula	RE: 4FRI Draft Environmental Impact Statement (DEIS) - Update on Extension]Comment Period[auto-markup end] and Document Availability HI John….Try this link: https://cara.ecosystem-management.org/Public/CommentInput?Project=34857	
Cote, Paula	RE: 4FRI Draft Environmental Impact Statement (DEIS) - Update on Extension]Comment Period[auto-markup end] and Document Availability HI John….Try this link: https://cara.ecosystem-management.org/Public/CommentInput?Project=34857	
Cote, Paula	As of April 6, electronic comments are not possible on the above stated website <http://www.fs.usda.gov/main/4fri/planning> http://www.fs.usda.gov/main/4fri/planning. Please advise. If you can forward this email as a formal electronic comment, I would appreciate it. Likewise, I will print this email as a written, hand-delivered comment to the Coconino Forest Supervisor.	(4-3). Thank you for submitting your comment in e-mail form. It was received.
Cote, Paula	My understanding that noise impact is part of the NEPA DEIS. Under the 4 FRI DEIS, I would like to emphasize noise impacts of off-road vehicles to adjacent urban residential areas in Flagstaff, specifically where the vehicles are officially prohibited by law in the surrounding national forest. This also should be an enforcement consideration for any off-limits area adjacent to any residential areas included in the 4 FRI.	(4-4) Thank you for your comment. However, this analysis is not proposing to make a decision on motorized use. Those types of decisions are typically addressed in a travel management analysis.
Cote, Paula	When the Forest Service published its latest Motor Vehicle Use Map for the Coconino National Forest on April 15, 2012, my experience is that enforcement actions of the simplest form have not been undertaken. For example, my family lives on the forest boundary in south Ponderosa Trails in Flagstaff. As of April 15, 2012, the designated national forest section immediately south prohibited motor vehicle use. However, to date, no forest access points to this area from the surrounding paved city streets are signed as prohibited to vehicles-motorcycles-ATVs or any other off-road vehicle. Likewise, no barriers are in place.	(4-5) As noted in response to comment 4-4, the designation of motorized use on the Forests is outside the scope of this restoration analysis.
Cote, Paula	In 2012, after email and phone correspondence with Forest Service's Mike Dechter, who is designated as the new Travel Management rule manager, no actions will be taken to signify this area as designate off limits to motor vehicles. Particularly in the spring, summer and fall, we experience frequent ATV and motocross traffic on any given day and time in the adjacent national forest that is supposedly off limits. My comments to Mr. Dechter was simply couldn't the forest service	(4-6) See previous responses 4-4 and 4-5.

Cote, Paula	provide some basic level of signage or enforcement at the residential-off limits forest interface. Basically, I was told no and to date have not seen any level of enforcement, notification, education, physical prohibition, or elsewise from the Forest Service. My simple comment is please help enforce the designated vehicle-ATV prohibition in residential-forest interface areas under existing or any future National Forest plans. My few simple personal efforts to educate some of the illegal motorcycle and ATV users have subjected my family to threats and have had our house "egged". Please be aware of this conflict. I strongly believe the Forest Service's authority to place basic signage and enact occasional enforcement can go a long way to help the peace of mind of homeowners at this interface. I am willing to meet with any member of the Forest Service to review this situation and provide a tour of the problem area. Thank you for your service and any future efforts.	(4-7): See previous response 4-4 and 4-5.
Cote, Paula	RE: 4FRI Draft Environmental Impact Statement (DEIS) - Update on Comment Period and Document Availability	(4-8) The website link where comments can be submitted was sent to the commenter.
Cruz, Nayda	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in	(134-1) Thank you for your comments. Please see our responses to letter 19.

	significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Culver, Angela	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could	Thank you for your comment. Please see our response to Letter #19.

Cummings, Shane	negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that	(60-1) Thank you for your comments. Please see our response to letter #19.

Cupani, Shirley	the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I	(193-1) Thank you for your comment and interest in the 4FRI. Please see the response to letter #19.

	have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Curley, June	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. While I appreciate the goals of the Four Forest Restoration Initiative (4FRI) that focus on restoring natural processes, using prescribed fire, and protecting	Thank you for your comment. Please see our response to Letter #19.

De Souza, Caylie	wildlife habitats and communities, I have some concerns with the way the project is currently being proposed. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The proposal is vague about how "open" the forests will become after the proposed treatment. This is important as it could negatively affect a number of wildlife species that depend on forest canopy. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean more trees are cut, significantly less canopy cover, and a much larger and negative impact on canopy-dependent species such as the northern goshawk. Types of openings being proposed include regeneration openings, interspaces, Vegetation Structure Stage 1 (grass/forb/seedling), Vegetation Structure Stage 2 (saplings 1-4.9"), and other canopy gaps. The Forest Service should provide more specific guidelines for the sizes of these openings and how much openness can be created cumulatively by these openings. Also, guidelines should be provided so that tree group and forest opening sizes are varied. Stakeholders, including Sierra Club and other conservation groups, created a document to specify that old growth would be protected and to protect larger trees with limited exceptions. The Forest Service should make this document on large tree retention an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using	(194-1) Thank you for your comment and interest in the 4FRI. Please see the response to letter #19.

	prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Decosse, Susan	From my limited knowledge about this project, it seems as if the US Forest Service is acting as if it just one more developer. Please don't make a 'master plan' for the forests we all share. And, most	(92-1) Thank you for your comment. The purpose and need for this restoration project may be found on page 8 of the DEIS.

	important, don't eradicate the beautiful Ponderosa pines, or the Mexican Spotted Owl, which is protected in the area you've planned to burn.	
Dewhurst, Stephen	Purpose and Need Statement: The Purpose and Need statement is presented in terms of the need to restore forest resiliency. The Purpose and Need statement does not recognize the primary practical motivation behind 4FRI: the widespread consensus on the need to reduce the risks, hazards, costs, and impacts of uncontrolled wildfire. There are no effective indicators of forest resiliency presented, and forest resiliency is discussed in only the broadest terms. The proposed action and alternatives are presented in terms of Vegetation Structural Stage, and management goals are taken directly from the goshawk guidelines. The presumption seems be that the a landscape managed according to the goshawk guidelines represent a state of forest resiliency. But it is very clear from the record that the goshawk guidelines were not developed to achieve forest resiliency, but rather they were based on a food chain/food web hypothesis. They were never designed to be a management paradigm for forest restoration. Without establishing a link between restoration, resiliency, and goshawks; there is no basis here for evaluating whether the proposed action would achieve the purpose and need of restoring or not. Bottom line: there needs to be a much better definition of restoration, the characteristics of a restored forest, and a well thought out and systematically applied set of indicators to assess and monitor if the forest is restored or not.	
Dewhurst, Stephen	Indicators: The use of indicators throughout the document is a mess. See the proposed directives for the 2012 Planning Rule (see section 32.1, Exhibit 1) for an example of how this should be set up. The indicators used to asses current conditions and to evaluate the alternatives are completely detached from the monitoring indicators. In the monitoring section, Fire Regime Condition Class (FRCC) is suggested as a monitoring indicator. If FRCC is to be used as a monitoring indicator, should not the same indicator be used to assess the current condition of the forest, and to define the desired future condition? Repeat for all indicators.	
Dewhurst, Stephen	Fire: There is an entirely inadequate attention paid to the impact of the proposed actions on fire risk and behavior. The same applies for bark beetles. Show me what the current situation looks like, and what the situation is expected to look like after the treatments are applied, and then 20 and 50 years later. Show me this in terms of the indicators of forest resiliency. These are direct effects for Sec. 1508.8 of the CEQ regulations. Right now, I don't think that the requirements of Sec. 1508.8 have been met.	(177-3) Thank you for your comment. Please see the fire analysis and silvicultural analysis in chapter 3 of the DEIS and FEIS. Current conditions were displayed in chapter 1 of the DEIS.
Dewhurst, Stephen	Under CEQ regulation 1502.8 the DEIS is to use plain language and may use appropriate graphics so the public and decision makers can clearly understand them.The maps and graphics are inadequate to show the design and intent of the proposed action and alternatives. Figure 6 in the DEIS shows the existing condition using an indicator called "canopy openness". Where are the maps that show what "canopy openness" is anticipated to look like after the proposed action or alternatives are implemented, or 20 years later? The same applies to figure 8 and figure 14. These before, post-treatment, and projected future conditions maps should be provided for each	The FEIS has clarified the difference in metrics of canopy openness pre and post treatment. Regarding maps and graphics that show the design and intent of the proposed action and alternatives, in addition to the 8.5 x 11 maps in the DEIS, a packet of poster-sized maps (of each alternative and the past, present and reasonably foreseeable actions associated with cumulative effects) was made available in both hard copy and DVD format. These maps were available electronically on the project's website at http://www.fs.usda/gov/main/ 4fri/planning. An interactive map, accessed electronically from the project's website was made available. The interactive map allowed users to scroll over each

indicator, and should be a major basis for comparing the alternatives. How am I supposed to understand the impacts of the treatments without appropriate maps? Other jurisdictions and private industry have been producing and using such maps for decades. For an analysis such as this which is intended to be the entire environmental review for 10 years over hundreds of thousands, a much better visual picture of impacts at the landscape scale is required.

and any feature within the project area to review all proposed treatments (by alternative). This feature also allowed the user to see where treatments are proposed in relation to wildlife habitat (specifically Mexican spotted owl and northern goshawk). The project's website states, "An interactive map of the proposed activities by alternative is available at http://my.usgs.gov/ppgis/studio/launch/5019. The intent of this map is to provide additional detail not available on printed maps, a simple way to compare alternatives, and the ability to supply a spatial component that you can use during the formal comment period. Map packets that provide treatment details by alternative are available upon request". Regarding the suggestion to provide an array of post-treatment graphics, it would be difficult to visually display all post treatment conditions. For this reason, the implementation guide was developed. Regarding canopy openness, a process which would guide the development of the 4FRI silvicultural prescriptions is being drafted. This direction would become part of the Implementation Plan in the FEIS. A white paper which documents how treatments would support heterogeneity has been developed (GTR-310). This document would become part of the final vegetation report's supporting documentation. The implementation plan (DEIS Appendix D) includes a variety of designs that utilize a "read the land" approach. For example on Pgs. 616, 619, 622, 624, 629, 632 and 634 - Overall, average group size would vary within this range depending on site quality, existing stand structure, and pre-settlement tree evidence; Table 139 includes guidance on placement of tree groups, interspace and regeneration openings. The placement would vary depending on existing conditions. Along with the design, Table 140 (DEIS Pg. 654) emphasizes that interspace, regeneration openings, tree group density and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (pg. 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size) and the amount of regeneration openings may be made during implementation to ensure tree group density remains outside of the "red zone" density.

Dewhurst, Stephen	Inadequate Range of Alternatives: CEQ 1502-14 directs the agency to rigorously explore and objectively evaluate all reasonable alternatives. It is recognized that this project is being conducted under the Collaborative Forest Landscape Restoration Program (CFLRP), and that the proposed action is strongly influenced by the partial consensus achieved in a collaborative advisory group. However, NEPA still requires looking at an adequate range of alternatives. Throughout section 3 of the DEIS, it is shown over and over again that there are small, and basically insignificant, differences between Alternatives B, C, and D. What is really needed is a full-restoration alternative, which looks at the outcomes and impacts of applying science-based ecological restoration on this landscape. I would love to know how that compares to the goshawk guideline-based alternatives already developed. Do the goshawk guidelines really look like ecological restoration? I'd really like to know. And if we don't know, how can we determine if the preferred alternative is really the best choice for society, or the best way to meet the purpose and need? A science-based ecological restoration alternative needs to be developed and evaluated.	In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS and a full restoration alternative that was consider but eliminated. This increased the number of alternatives to eleven. More importantly than the sheer number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The Agency's procedures for implementing NEPA state, "Under the CEQ regulations, the Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). No specific number of alternatives is required or prescribed. Develop other reasonable alternatives fully and impartially. Ensure that the range of alternatives does not prematurely foreclose options that might protect, restore, and enhance the environment" (FSH 1909.14, page 31). "The range of alternatives considered by the responsible official includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm "(FSH 1909.14.4, page 36). The DEIS (DEIS, pp. 48 to 104) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report). This is consistent with the Agency's direction on alternatives, "Develop and consider alternatives that would resolve conflicts about the proposal" (FSH 1909.14, page 32) and using collaboration, "Ongoing collaboration may often result in modification of a proposed action or alternative(s), resulting in a better proposal and ultimately a better decision. Such changes may not necessarily require the development of a new alternative if they can be accommodated through modification of an existing alternative" (FSH 1909.14, page 32). The IDT identified two metrics that will be added to the comparison of alternatives table and discussion: volume of emissions and potential effect to sensitive receptors (smoke).

Dewhurst, Stephen	Best Available Science: The CFLRP calls for the use of best available science. Over 20 million dollars has been spent on ecological restoration research in Northern Arizona in the last decade or so, and hundreds of peer-reviewed papers have been published. But I see virtually no influence of this science on the alternatives or the analysis. The goshawk guidelines and much of the knowledge base are based upon agency technical reports, conference presentations, and forest service management policies. Anecdotal statements are made which claim that the goshawk guidelines look a lot like ecological restoration, but no science is presented which compares the scientific literature to the assumptions behind the goshawk guidelines. A recent paper (Beier and Ingraldi, 2012) calls into question whether forests managed according to the goshawk guidelines are even good for goshawks or not. I have seen their evidence, it is compelling.There is no science-based proof that implementing the goshawk guidelines at this scale will result in the ecological resiliency called for in the Purpose and Need statement. This evidence needs to be developed and presented in the DEIS.	
Dewhurst, Stephen	Site Specificity: since the current DEIS does not show the impacts of the alternatives across the landscape in terms of indicators describing ecological resiliency, I cannot see how different parts of the forest will be affected by the proposed actions. The analysis does not meet the standard of site-specificity. Adding the indicator-based current, post- treatment, and projected future condition maps as described above would address this issue	
Dewhurst, Stephen	Analysis: For a project that is going to cost millions of dollars and take a decade or more,in a time of austerity, I find the minimal economic analysis to be inadequate. I want to know the cost to the government and the economic benefits to society of the proposed action and alternatives over time, at least.	
Dickens, Glen	The Arizona Antelope Foundation (AAF) The Arizona Antelope Foundation (AAF) an Arizona wildlife not for profit organization chartered in 1992 has reviewed the aforementioned DEIS and we find the document to be well written and providing a methodology for lessoning the potential for catastrophic fires that can reduce wildlife habitat over large areas. While the AAF did not participate in the Stakeholders Group it is clear that the document represents many compromises and we understand that those become necessary to make progress to	(173-1) This letter is a duplicate of letter 168. Please see our responses to letter 168.
Dickens, Glen	restoring wildlife habitat and forest health to pre-settlement conditions	(168-1) Thank you for taking the time to re view and comment on the project.
Dickens, Glen	In our review of the document both Alternatives B and C are acceptable to the AAF since they both move toward restoring forest health in a timely fashion. That said we strongly support and recommend the Preferred Alternative and offer the following specific comments that we would like to see addressed in the Final EIS: 1. There are several references to closing forest roads in reading the DEIS, it is unclear to if the road closures are additive to those proposed under TMR or if this is road closures addressed in TMR. If this is intended to cause additional road closures you will need to	(168-2) Thank you for your comment. Page 28 of the DEIS states "The TMR process identified a need to decommission approximately 770 miles of existing system and unauthorized roads on the Coconino NF. On the Kaibab NF, approximately 134 miles of unauthorized roads (often referred to as user-created routes) were recommended for decommissioning." These are the only roads proposed for decommissioning/closing. The 4FRI DEIS is solely disclosing the effects of closing roads that have been outlined the each Forests respective TMR decisions. There are no additive roads proposed for closure or

	clarify this issue in the final EIS.	decommissioning. The transportation analysis in the FEIS has been updated with final road miles.
Dickens, Glen	We strongly support the effort at grassland restoration. The AAF and other Wildlife Conservation Organizations have actively been working to restore this important habitat and believe it is a progressive step to include this in the final EIS. Grasslands are a critical habitat for Pronghorn antelope and both habitat quality and connectivity for this key species is significantly decreased as woody species invade this habitat type.	(168-3) Thank you for your support.
Dickens, Glen	. The concept of adaptive management is stressed in the DEIS but to effectively use this management concept, it is critical to monitor ecological responses to the different treatments in order to fully use the information generated by different treatments as the project progresses. Often, restoration focuses on treatments and monitoring is poorly funded. For adaptive management to be meaningful, it is critical to provide funding for monitoring natural resource responses to treatments.	(168-4) We agree with your comments. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. ,
Dickens, Glen	4. In reviewing the Wildlife Specialist Report we concur with most of the information presented; however we feel that the statements that hunting is the most influential factor in determining Pronghorn, mule deer, and elk numbers on the forests is very misleading. While elk are generalists and populations do well in a variety of conditions, we feel that grassland degeneration has and will continue to have dramatic adverse impacts on Pronghorn population numbers. Conservative buck only hunting Pronghorn does not significantly decrease resident populations; habitat conditions do. The final EIS should be reworded to portray accurately the impact of habitat decline and utility on resident pronghorn populations. Improved forest health and conditions will result from forest restoration independent of the legal annual harvest of Pronghorn, mule deer and elk. Habitat quality and quantity is the key for managing wildlife populations with hunting as a tool, but without adequate habitat, wildlife populations will remain in jeopardy.	(168-5) The section of the wildlife specialist report that the commenter is referring to is the Management Indicator Species section, pages 431-440. The specialist report does evaluate the effects of habitat treatment for elk (pages 430-431), mule deer (pages 435-437) and pronghorn (pages 438-440). This can be made clearer in the write-up, particularly for pronghorn. The analysis did not just rely on the fact that hunting has an important influence on these species. Each species and the habitat they are an indicator for was reviewed to determine how each alternative would impact forestwide habitat and population trends. For example here is the summary for Alternative C for pronghorn on the Kaibab NF: Alternative C would change the forestwide grassland habitat trend to increasing in both short and long term. This is due to the removal of trees in current grasslands and the restoration of historical grasslands. The alternative would have the pronghorn forestwide population trend as stable to increasing. There would be an improvement in pronghorn habitat connectivity within forested areas and prescribed fire would increase diversity and productivity of herbaceous plants, will improving foraging and fawning habitat for pronghorn. However, the forestwide population trends for pronghorn are largely influenced by hunting, drought, and loss of connectivity due

		to human development. For these three species, the wildlife biologists worked closely with the Arizona Game and Fish Department habitat specialist. It was Arizona Game and Fish who noted that hunting is one of the primary activities for establishing population trends. Hunt structures are designed to increase, decrease, or maintain a stable population trend depending on the state agency population goals. Also note as shown above in the summary for Alternative C, hunting was not the only stated outside influence on the forestwide pronghorn population trends.
Dickens, Glen	. It is important to point out that there are references such as on page #291 that indicate that there will be positive impacts from road closures; this concept is not universally accepted. The forests should continue to be managed for multiple recreational pursuits. It is important that the final EIS be reworded to indicate that some forest users see benefits from road closures but many others find this a needless burden on their use and enjoyment of our national forests.	(168-6) Thank you for your comment. The decision to close the roads to motorized uses was not made in this analysis but made in the TMR analysis. For these reasons the recreation analysis focused on the impacts to recreation opportunities and settings from the actions proposed. In the DEIS, the recreation analysis states, “There would be short-term and temporary decreases in the provision of recreation opportunities on parts of the Coconino and Kaibab NFs. Some forest users would be dissatisfied with their lack of access to portions of the project area during management activities such as thinning projects and prescribed fires. Areas may be closed to the public due to hazardous conditions which would result in forest user displacement and user dissatisfaction" (DEIS, p. 287). The recreation settings analysis states, "Decommissioning of existing and unauthorized roads would improve recreation settings over time and would improve ROS classes. Temporary road construction would result in short-term disturbance and temporary changes in ROS classes. New linear features would be added to recreation settings reducing the scenic quality for 3 to 10 years. There may be some increase in illegal motorized vehicle use of these roads until they are decommissioned. Once these roads have been decommissioned, they are usually not apparent to the casual user (DEIS, p. 288).
Dickens, Glen	In conclusion, the Arizona Antelope Foundation endorses the Preferred Alternative as outlined in the DEIS and believe that continued open and transparent collaboration with the Stakeholder Group and the public is essential for making progress in resetting the environmental clock to the point where our forest health is not left to the impacts of periodic catastrophic landscape level fires.	(168-7) Thank you for your support.
Draxler,	Below is a map which shows the three communities most affected by	(18-1) Thank you for your comment. We considered an alternative that

Ron	the priority areas in years 1-10 of your project. If you are going to use mechanical thinning on 350,000 acres, it would make sense you do that in the areas down wind and where the smoke would settle at night. Then use sheep and goats on the ground in these mechanical areas. You can see how effective sheep and rams can be in a show called "Americas Heartland" which aired on channel 8 September 19, 2012. It can be viewed on their website. I live in Sedona and over the past couple years of prescribed burns, my immune system and lungs have deteriorated a lot from the air quality. The above idea would be an excellent way to show concern for the local population while doing what is necessary for the forest. While burning might be the best in this area for the forest, it is not for the largest populations in the Coconino National Forest! This would be a wonderful compromise for us tax paying citizens funding this project. Lastly, health of the residence in the National forest should have a greater priority than the health of the forest. All the best,	would have eliminated the use of prescribed fire and utilize other methods such as grazing (web-based DEIS, Eliminate the Use of Prescribed Fire, pp. 54-56). The alternative was considered but eliminated from detailed study because we determined that it would not meet various elements of the purpose and need. It would be possible to use mechanical treatments to move biomass offsite and reduce surface fuels that would have been burned and produced smoke. However, mechanical treatment would not replace the role fire has in improving vegetation composition and diversity on: (1) 59,391 acres of existing grasslands, (2) over 56,000 acres of ponderosa pine with a savanna or grassland reference condition, (3) grassland inclusions within 308,000 acres of ponderosa pine forested areas, (4) 5,261 acres of pine-sage, (5) 1,471 acres of aspen, and (6) thousands of acres where Gambel oak exists within the pine forest. Without the ability to use prescribed fire to: (1) stimulate understory vegetation growth, (2) reduce the natural surface fuels (that have accumulated since the interruption of fire on the landscape), and (3) maintain desired canopy base heights, canopy bulk densities, and reduced ladder fuel conditions (that were attained through mechanical treatment), it is estimated the project area would begin to move away from forest structure and pattern and resiliency desired conditions within 10 years of the mechanical treatment. The use of alternative fuels treatment methods in lieu of prescribed fire could provide reductions in fuels but would not meet the ecological need of a fire-adapted landscape. In the case of grazing, the level that would be needed to maintain the project area without fire would exceed forest plan allowable thresholds. Using grazing as a surrogate for prescribed fire would be contrary to the purpose and need which is designed to increase vegetation composition and diversity, and move toward improved soil productivity and watershed function (web-based DEIS, summary, page 56). Also see our response to letter #6 for information on emission reduction techniques that would be used to minimize smoke.
Drobeck, Charly	Are you kidding? Your proposed plan to burn upwards of 1 million acres of forest in the name of restoration is insane on so many levels it boggles the mind. Just the carbon output alone should make it illegal! Let alone the loss of habitat, horrible air pollution and more...I guess if we follow the money, we'll find out who is really behind this.	(128-1) Thank you for your comment/opinion. Please consider reading the environmental consequences for vegetation, fire, wildlife and climate change that can be found in chapter 3 of the DEIS.

	Meanwhile, I just heard an interview with FS officials saying their budget was being slashed, and that we've a 5% less fire crews during the worst drought in history....is this propose burn plan wise? I say no, no no. Do not let this happen	
Duke, Kathy	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and	(187-1) Thank you for your comment. Please see response to letter # 19.

	adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited	
Dysart, Lorrie	exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the	(67-1) Thank you for your comments. Please see the response to letter #19.

Finholt, Tom	proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including	(114-1) Thank you for your comments. Please see our response to letter #19.

Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Firstenberg, Arthur

The DEIS identified effects of smoke and particulate matter on "individuals with chronic obstructive pulmonary or cardiovascular disease of influenza, asthmatics, the elderly, and children" (at p. 166), without identifying any methods for mitigating these effects and ensuring a safe and healthful environment.

Firstenberg, Arthur

The DEIS must include "means to mitigate adverse environmental impacts—here, impacts on these sensitive populations. The DEIS may not just say there will be impacts without saying how they will be mitigated. 3.40 CFR 1502.14(f) Regarding these sensitive

(183-1) The DEIS at page 169 under Regulatory Requirements states, "Prescribed fire is implemented only with approved site specific burn plans and with smoke management mitigation and approvals. All burning is conducted according to ADEQ standards and regulations. These standards include the legal limits to smoke emissions from prescribed burns as imposed by Federal and State law. The ADEQ enforces these laws by regulating the acres that are treated based on expected air impacts. These regulations ensure that effects from all burning meet Clean Air Act requirements. Prescribed fires are initiated under conditions that allow managers to meet both control objectives (fire behavior) and resource objectives (fire effects, including air quality impacts)."Additional information is in the Fire Ecology / Air Quality report under 'Affected Environment > Air Quality and Smoke Effects' (pages 76 – 92). Additionally, there is an analysis of projected air quality impacts in this report for each alternative analyzed, beginning with Alternative A (no action – air quality and smoke effects on pages 119 – 120); Alternative B (air quality and smoke effects on pages 159 – 161); Alternative C (air quality page 189); and Alternative D (Emissions/Air Quality pages 221 – 222).

(183-2) The DEIS identifies smoke sensitive areas and receptors on pages 167 to 169. DEIS pages 568 and 569 in Appendix C (Design Features, BMPs, and Mitigation) includes FE3, FE8, and FE9 which include Emission Reduction Techniques (ERTs) that would be utilized

	populations, The DEIS must, but does not, “include appropriate mitigation measures not already included in the proposed action or alternatives.”	when possible to minimize impacts to sensitive receptors of emissions. ERTs are recommended by the ADEQ as effective methods for minimizing impacts to sensitive receptors. Additional details are in the Fire Ecology/ Air Quality report. Also see responses to letters 6 and 11.
Firstenberg, Arthur	The EIS must include information on “the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.”This project will convert forests into “groups of trees mixed with interspaces” by permanently removing around half the biomass of the project area, providing enormous quantities of wood products during the first ten years. Obviously such productivity cannot be sustained. The DEIS does not provide the required information about how this will enhance long-term productivity.	(183-3) The DEIS addresses short-term uses and long-term productivity on pages 329-330. Approximately 542,705 acres in the project area are classified as forested (DEIS, page 122). Alternatives B through D would restore historic grasslands, savannas and forest openings by removing encroaching pine (DEIS, page 141). Alternatives B-D results in vigorous aspen free of competition from overtopping pine. The alternatives enhance the sage component and restore the historic forest pattern with in the pine-sage mosaic. In terms of sustained yield of forest products, alternatives B-D provide a sustained yield of timber products (biomass) (DEIS, page 141). Table 45 in the DEIS displays movement towards the desired vegetation size class in both the short (2020) and long term for acres in goshawk habitat (outside of PFAs). In alternative B through D landscape scale forest resiliency and function in ponderosa pine is expected to move towards desired condones on 487, 233 to 510,346 acres (DEIS, page 99). The soil and water quality analysis states approximately 59 percent of the project area is dominated by functional-at risk 6Th code watershed and about 315,800 acres of impaired watershed. (DEIS, page 107). In alternative A, about 8 percent of the project area would have a loss of soil productivity with a severe fire event (DIES, page 109). In alternatives B-D, acres where soil productivity would be maintained or improved range from 587,923 acres to 470,148 acres (DEIS, pp. 110-111. Table 34 in the DEIS indicates 18 to 23 percent of functioning at-risk watersheds would improve. The analysis indicates treatments maintain or improve both short and long term productivity for vegetation, soil and water resources.
Firstenberg, Arthur	The DEIS addresses only cumulative impacts of actions within the Coconino and Kaibab National Forests, but not the cumulative impact of all of the actions in the Collaborative Forest Landscape Restoration Program. Each of the individual projects in the program is a “small component part” of the whole program, with cumulative impacts on climate change, air quality, public health, migrating birds, threatened and endangered species, and other environmental factors. The Forest Service is ignoring these cumulative, nationwide impacts	(183-4) Your recommendations are categorized as being “already decided by law, policy, regulation and outside the scope of the analysis. Appendix F in the DEIS described past, present and reasonably foreseeable actions that were generally relevant to the landscape-scale analysis. For example, using the Kaibab and Coconino forest boundary would have been meaningless for the air quality cumulative effects analysis. The air quality cumulative effects analysis was based on the relevant airshed and included the Prescott NF (DEIS, pp. 172-173). Each

	through illegal segmentation.	resource then addressed cumulative effects at the scale that was specific, relevant and useful to their resource in order to focus the analysis on those actions that are likely to have a significant cause and effect relationship. This is in alignment with 40 CFR 1508.7 which states, "The analysis of cumulative effects begins with consideration of the direct and indirect effects on the environment that are expected or likely to result from the alternative proposals for agency action. Agencies then look for present effects of past actions that are, in the judgment of the agency, relevant and useful because they have a significant cause-and-effect relationship with the direct and indirect effects of the proposal for agency action and its alternatives"". The Agency's NEPA policy handbook (FSH 1909.15, 10, 15.2) states, "Spatial and temporal boundaries are the two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial and temporal boundaries set the limits for selecting those actions that are most likely to contribute to a cumulative effect. The effects of those actions must overlap in space and time for there to be potential cumulative effects". However, in response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts.
Firstenberg, Arthur	"Not more than a total of 20,000,000 acres of Federal land may be treated under authorized hazardous fuel reduction projects." 16 U.S.C. § 6512(c). Since the passage of this Act, about 20,000,000 acres of Federal land have already been included in hazardous fuel reduction projects. This project is authorized by 16 U.S.C. 7303, which established the Collaborative Forest Landscape Restoration	(183-5) The project is not being considered under HFRA. The reference to 36 CFR 218.22, which provides notice and comment procedures, pertains to the 36 CFR 218 Project-Level Predecisional Administrative Review Process, Subpart B. HFRA is specific to 36 CFR 218, Subpart A.

Program, requiring all ecological restoration treatments to be conducted in accordance with "(1) the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.); (2) the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.); and (3) any other applicable law." The law prohibiting the burning of more than 20,000,000 acres of Federal land under authorized fuel reduction projects has not been repealed, and must be complied with. Furthermore, the request for comments on the DEIS sent out by the Forest Service states that "Comments must meet the requirements of 36 CFR 218.22." 36 CFR 218 are regulations implementing the Healthy Forests Restoration Act. The rest of that Act must be complied with, including the limit on acreage burned.

(183-6) See our previous responses to letters 6 and 11 for smoke emission mitigation. The Rehabilitation Act of 1973 prohibits discrimination on the basis of disability in programs conducted by Federal agencies. While the effects of smoke exposure may differ among individuals, the proposed 4FRI treatments do not discriminate against individuals. The environmental justice analysis discusses the potential for disproportionate effects (DEIS pg. 290; socioeconomic specialist report, pg. 16). The development of burn plans associated with prescribed burning would include modeling to determine the most appropriate conditions under which to burn in order to minimize smoke impacts (DEIS pg. 296; socioeconomic specialist report, pg. 24). We considered an alternative that would have eliminated the use of prescribed fire and utilize other methods (DEIS, Eliminate the Use of Prescribed Fire, p.54). The alternative was considered but eliminated from detailed study because we determined that it would not meet various elements of the purpose and need (see DEIS, page 54-56). In response to the concern over emissions from prescribed fire, Alternative D was developed. Alternative D decreases the acres that would receive prescribed fire by 30 percent when compared to alternative B (proposed action) (DEIS, page v).

Firstenberg, Arthur

This project will discriminate against persons disabled with multiple chemical sensitivity ("MCS"), who cannot tolerate, or even remain in their homes, when impacted by smoke and chemical emissions from fires.The DEIS is inadequate, and in violation of the Rehabilitation Act, in wholly failing to address or even mention, let alone mitigate, impacts on persons with this disability of repeated and continual burning.

Firstenberg, Arthur

The DEIS's treatment of migratory birds on pages 239-243 is wholly inadequate, full of conclusory statements ("There would be no measurable negative effects to migratory bird populations") that are not supported by any scientific studies, and utterly fails to address cumulative, nationwide impacts. The DEIS states that the project will

(183-7) A summary of the migratory bird analysis is located on pages 239-243 of the DEIS. Page 174 of the DEIS refers the reader to the specialist reports for detailed information on wildlife and plant methodology, analysis assumptions, best available science and data, habitats, populations, and effects that are not repeated in the DEIS. The

kill an unspecified number of migratory birds (p. 243), and will otherwise reduce their habitat, and does not comply with the requirements of 16 U.S.C. § 704 regarding the taking and killing of such birds.

The DEIS's treatment of endangered species is wholly inadequate, and does not comply with the requirements of 16 U.S.C. § 1539 regarding the taking of endangered species. For example, the preferred alternative proposes to burn 98 percent of protected Mexican Spotted Owl habitat within the project area, which will have "adverse effects on individual owls" (p. 181) due to fire, smoke, loss of habitat, and other project activities. II.ALTERNATIVES B, C, AND D WILL BE DISASTROUS FOR MEXICAN SPOTTED OWLS. All the alternatives will involve severe thinning of owl habitat, eliminating most closed canopies, when the owls required a closed canopy to

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reproduce. The preferred alternative proposes to burn 35,566 out of 36,455 acres of owl habit, including 6 critical habitat units.

All the alternatives, says the DEIS, will increase noxious weed growth (p. 258). Not to worry, says the Forest Service: amendments 20 (Coconino NF) and 7 (Kaibab NF) have allowed the use of herbicides

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to control them (p. 259). But the DEIS is then required to address the massive use of herbicides that this project would entail by

rationale for the determination of "no measurable negative effects to migratory bird population" by species is located on pages 434-435. The DEIS refers the reader to appendix 12 of the wildlife report for the complete cumulative effects discussion. See our previous response as it relates to cumulative effects analysis requirements. However, the DEIS provides a summary of those treatments and acres that were considered for cumulative effects. For example, the cumulative effects analysis included (only partial list presented here) 86,290 acres of thinning from other projects in ponderosa pine habitat, 153,211 acres of prescribed fire, 4,416 acres of savanna restoration on the Kaibab NF, 683 acres of aspen restoration on the Kaibab and 4,637 acres on the Coconino NF (DEIS, page 241). The analysis complies with 16 U.S.C. §

(183-8) The Forest Service has consulted with U.S. Fish and Wildlife Service (FWS). The FWS issued a biological opinion (AESO/SE22150-2011-F-014) on October 20, 2014 and the project has been issued an incidental take for Mexican Spotted Owls. This project complies with the requirements of 16 U.S.C. § 1539. The wording on page 181 of the DEIS is taken out of context. The following is the complete discussion: "Fire and smoke effects from prescribed fire may disturb individual birds in and adjacent to the treatment area, but timing restrictions and low-severity burn prescriptions would reduce impacts and largely lead to no or only short-term effects. However, the amount of burning across the landscape under alternatives B, C, and D creates the potential of smoke settling into a PAC, potentially leading to adverse effects to individual owls. It (DEIS MSO analysis) does not state burning itself within the PAC would result in the adverse effect. Page 181 of the DEIS states "Overall changes to PAC habitat would be limited, but would focus on improving important structural elements like large tree development and retention, and reduced risk of high-severity fire." Page 182 notes that changes in threshold habitat would be similar to those in PACs. This would provide the closed canopy needed for nesting and roosting habitat.

(183-9) The comment omits a key finding in the noxious and invasive weed assessment for this project, "With the incorporation of mitigation and best management practices (BMPs) (see appendix C of the DEIS), these effects would be reduced to nonsignificant levels" (DEIS, page 258). The effects of herbicide use were analyzed and disclosed in the

	encouraging noxious weeds to proliferate over half a million acres of forest land, and the impacts of those herbicides on animals, plants, waterways, and humans living in and around the project area.	Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005). The 4FRI project tiers to this separate NEPA analysis. The Noxious or Invasive Weed EIS evaluated the impacts of herbicides and proposed restrictions on the use of these chemicals within limited spray zones (buffers around human habitation and recreation sites), near water and other critical wildlife habitat areas. These restrictions and extra protective measures are outlined in the Appendix B Design Features, Best Management Practices, Required Protection Measures, and Mitigation Measures of the weed EIS. BMP B15 (page 570 of 4FRI DEIS) incorporates the weeds mitigation measures (appendix B of the weed EIS) in their entirety. Page 256 of the 4FRI DEIS references the incorporation of Appendix B of the Weed EIS into Forest Plan Amendments 20 (CNF) and 7 (KNF).
Firstenberg, Arthur	The DEIS (p. 174) proposes that species that need a closed canopy, including the northern goshawk, the Mexican Spotted Owl, Abert's squirrel, turkey, mule deer, black bear, and some songbird species, will all be able to flee the areas that are thinned and burned and congregate in the 17 percent of the forest that is left in closed canopy until they learn to "adjust, adapt, or eventually relocate." No science whatever is cited for this absurd and patently wrong notion that species that have never been able to survive outside of a closed canopy will learn to do so over a period of five or ten years! Nor has any thought been given as to exactly where all this wildlife are supposed to be able to "relocate" in the event that they do not in fact "adjust" or "adapt." This is why addressing cumulative, nationwide impacts is so important, and why the failure of the Forest Service to do so invalidates the DEIS. It is the policy of the Forest Service to eliminate closed canopies everywhere in the country. There simply will be nowhere for the animals (the ones that survive the initial fire-bombing) to go. If only 17 percent of the forest is left in closed canopy (p. 174), then the carrying capacity of the land will ensure that only 17 percent of those animals are left also. The stated policy of the Forest Service is to permanently thin the forest, to burn every five years to ensure that a closed canopy never returns, and to maintain such conditions at least until 2060 (p. 324). This is explicitly stated in the DEIS: "Long term (2040 to 2060), high priority strategic recommendations… include[] thinning to create a mosaic of clumps	(183-10) The DEIS on page 174 noted that 17% of the ponderosa pine treatment area would remain in closed conditions. This 17% represents the treatment area not the total forest area on both forests. In addition, it is also noted on page 174 that 42% of the treated area would be in moderately closed canopy. The DEIS (page 174) notes that an additional 17% would be in a mix open and closed conditions. In addition, 13% of the project area (the broader analysis area for the project) that would not be treated. Appendix G of the DEIS goes into greater detail on bridge habitat. As noted in the beginning of the appendix, the bridge habitat analysis is for canopy dependent species which does not equate to only a closed canopy vegetation structure but also includes moderately closed canopy also. Figure 79 shows the distribution of the moderate and closed canopy habitat within the project area. Appendix G also shows by species how the bridge habitat would provide for each species in the short term as other treated stands grown into desired condition across the broader landscape. Regarding the scale of a cumulative effects analysis, please see our previous response.

	and groups of trees with intermixed openings, treating more acres with prescribed burns, and allowing more wildland fire to burn." The stated goal of the Forest Service is to replace forests with "a mosaic of interspaces and tree groups on 41 to 44 percent of treatment acres" (p. xi), and to maintain such conditions for at least the next fifty years.	
Firstenberg, Arthur	All the existing literature says that between one-half of one percent and two percent of all prescribed burns escape control. The EIS must document the frequency, acreage, and intensity of escaped burns in the past, their probable frequency and extent in the future, and their impacts, especially considering the unprecedent scale of planned burning in this and other current and future projects.	(183-10) It would be speculative at best, and outside the scope of this analysis, to predict the potential for escaped fire. In any prescribed fire, there is a chance of a fire escaping the spatial limits that have been laid out. For the USFS, from 1996 – 2001, there were 235 escapes out of 24,133 prescribed fires implemented (average success rate of 99 percent). From 2003 – 2005 there were 38 escapes out of 10,920 prescribed fires implemented. This is an average success rate of 99.7 percent (Sexton 2006). The latest data available is an overview of the 2012 season. According to the National Interagency Fire Center, 16,626 prescribed fires were implemented. There were 14 escapes for an average success rate of 99.91 percent. For purposes of consulting with the US FWS, as required by the Endangered Species Act, the biological assessment (BA) did address the potential for prescribed fire to result in torching in Mexican spotted owl habitat. The BA states, "Unintended torching could occur during a prescribed burn. Torching of individual or small groups of trees could mimic gap-producing processes that occur under natural forest processes." (USDA 2014, page 73). However, torching of individual or small groups of trees is not equivalent to "escaped fire". The BA is an appendix in the wildlife report.
Firstenberg, Arthur	THE CONCLUSIONS ABOUT CARBON AND CLIMATE CHANGE ARE CONTRARY TO COMMON SENSE AND CONTRADICTED BY THE SCIENCE CITED Seven studies are referred to in support of the incredible claim that burning forests makes them into carbon sinks, while not burning them makes them into carbon sources.	(183-12) See our responses below which discusses each reference included in the comment.
Firstenberg, Arthur	Forest Restoration Draft Report. Prepared for M. Selig. Grand Canyon Trust. (cited on page 323) This is a draft of an unpublished report—not even a study—that is unavailable and is apparently based on Hurteau and North 2009 (below).	(183-13) The DEIS at page 323 states: "Burn Frequency and Carbon Storage: Woods et al. (2012) found that, although burn frequency affected the rate and total amount of carbon storage in a ponderosa pine forest, both 20-year and 10-year fire return intervals produced forests that were net carbon sinks, while the no action alternative forest became a net carbon source. Figure 47 displays carbon storage per acre comparing a no action "baseline" scenario with 10- and 20-year

Firstenberg, Arthur	Hurteau, M. and M. North 2009. Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios. (cited on page 328) This is a study from the moist Sierra Nevada, not the dry Southwestern desert, and its conclusion at any rate is the opposite of what the DEIS claims, because the DEIS fails to consider soil carbon. "When totaled over a century and added to the wildfire emissions, total released C[arbon] was greater than in the	fire return intervals in a ponderosa pine forest of northern Arizona (adapted from Woods et al. 2012)."The Fire Ecology report at pg. 252 states""…Woods et al. (2012) found that, although burn frequency affected the rate and total amount of carbon storage in a ponderosa pine forest, both 20 year and 10 year fire return intervals produced forests that were net carbon sinks, while the no action alternative forest became a net carbon source…"The Fire Ecology report at page 254 states: "In the long term (e.g.100 years) the action alternatives would create more resilient forests, less prone to stand replacing events and subsequently able to store more carbon by an increased availability of live trees, longer lived wood products (in the form of large trees), and energy products created from resulting slash which are used in the place of fuels (North and Hurteau 2011, Soreson et al. 2011, Woods et al. 2012). The final report was issued later in 2012, with no changes in conclusions, and the reference has been updated in the final report. Reviews and syntheses of multiple research studies have always been a valuable source of information. Combining and/or comparing multiple datasets in one document can produce added value because the studies can be viewed in context with others, and the combined data sets may strengthen or weaken conclusions from the individual studies, and/or produce new conclusions by remixed data and conclusions. Woods et al. (2012) took data and results from published studies (mostly from Northern Arizona) and synthesized a new study to estimate the potential for restoration efforts (4FRI in particular) to mitigate the risk of catastrophic wildfire and stabilize carbon storage in ponderosa pine forests. The study specifically addressed the area proposed for treatment by the 4FRI, so is certainly pertinent. This study was a finalist for the Barrett Prize, and there is a manuscript in review in the journal of Carbon Management. This report is available upon request and is in the project record. (183-14) The DEIS at page 327 states, "The low to moderate effects that would result from alternatives B-D should afford for greater carbon storage in southwestern fire-adapted ecosystems over time (Hurteau and North 2009). Research by Hurteau and North (2009) has also shown that the long-term gains acquired through prescribed fire and mechanical thinning outweighs short-term losses in sequestered carbon. In the long term (e.g., 100 years), thinning and burning would

non-burn treatments," say Hurteau and North. "Current C[arbon] accounting practices can be at odds with efforts to reduce fire intensity," they say.

create more resilient forests less prone to stand-replacing events and, subsequently, able to store more carbon in the form of large trees." The Fire Ecology report at page 252 states: "Fuel treatments (e.g. thinning, prescribed fire) as identified in the proposed action, promote low-density stand structures, characterized by larger, fire resistant trees. This strategy should afford for greater carbon storage and southwestern fire adapted ecosystems over time (North et al. 2009, Hurteau and North 2009)." The report at page 303 states, "Forests serve as significant carbon reservoirs; however, large-scale fire events can counter this benefit by releasing significant amounts of carbon into the atmosphere. Fuel treatments (e.g., thinning, prescribed fire), as identified in the proposed action, promote low-density stand structures characterized by larger, fire resistant trees. This strategy should afford greater carbon storage in southwestern fire-adapted ecosystems over time (North et al. 2009, Hurteau and North 2009)."The objective of the study was to model the amount of live and dead tree based carbon stored and released over 100 years with and without wildfire in the Sierra Nevada mixed conifer after fuel reduction treatments. We agree that mixed conifer is not the same as ponderosa pine, though there can be similarities. We would also point out that the 4FRI area is not 'the dry Southwestern desert'. The study simulated prescribed fire at "20-year intervals to match the historic fire regime for the Sierran mixed conifer (McKelvey and Busse 1996, North et al. 2005). This is approximately twice the natural fire regime of the ponderosa pine within the area proposed for treatment by the 4FRI. Hurteau and North state that "Model runs show that, after a century of growth without wildfire, the control stored the most C. However, when wildfire was included in the model, the control had the largest total C emission and largest reduction in live-tree-based C stocks. In model runs including wildfire, the final amount of tree-based C sequestered was most affected by the stand structure initially produced by the different fuel treatments. In wildfire-prone forests, tree-based C stocks were best protected by fuel treatments that produced a low-density stand structure dominated by large, fire-resistant pines." The sentence following the quote Mr. Firstenburg provided in reference to "…greater than non-burn treatments" is: "Recent research suggests that immediate wildfire emissions may only be a portion of actual C losses, if

Firstenberg, Arthur	Hurteau, M. et al. The carbon costs of mitigating high-severity wildfire in southwestern ponderosa pine. Global Change Biology (2011) 17:1516-1521. (cited on p. 325) All this study claims to say is that there is 2.3 times as much carbon in our forests today than there was in 1876, and that therefore we can afford to remove half the carbon from today's forests to restore "original" conditions—a questionable conclusion based on questionable assumptions about conditions in 1876, and one that does not say that burning a forests turns it into a carbon sink.

the fire leaves few surviving trees (Kashian et al. 2006). Auclair and Carter (1993) calculated that high-intensity, post wildfire C release was approximately three times the direct release of CO2 during the fire event. In ponderosa pine, direct flux measurements found higher CO2 emissions from a high-intensity burn than those from an unburned site, even 10 years after fire (Dore et al. 2008). Future research may more effectively incorporate these C losses associated with high-intensity fire into models, but, in this paper, we compare only direct C emissions occurring during the fire." The final paragraph of the paper is "In forests that historically burned with high frequency and low severity, adding to the C baseline by increasing stocking levels may exacerbate the modern shift toward high-severity fire produced by fire suppression and climate change. Current C accounting practices can be at odds with efforts to reduce fire intensity in many western US forest types. Although the concept of restoring forests in the western US to some pre-settlement target may not be feasible as the climate changes, reducing fire severity and increasing and stabilizing tree-based C storage may be achieved with fuel treatments that promote low-density, large pine-dominated stand structures. "There are sufficient similarities in the 4FRI area and in the area modeled in this study (particularly those areas with pine dominated stands) in regards to carbon sequestration, that this study, when combined with others, provides some valid information that is pertinent to the analysis.

(183-15) The DEIS at page 325 states, "Although fire-excluded forests contain higher carbon stocks, this benefit is outweighed in the long term by the loss that would be likely from uncharacteristic stand-replacing fires if left untreated (Hurteau et al. 2011). In alternative A, 34 percent of the area would have the potential for high-severity fire effects from crown fire. Large-scale fire events that could occur with no treatment (alternative A) could release significant amounts of carbon into the atmosphere. "The fire ecology report at pages 252 and 303 states: "Although fire-excluded forests contain higher carbon stocks, this benefit is outweighed in the long term by the loss that would result from uncharacteristic stand replacing fires (Hurteau et al. 2011)". This information comes from the Kaibab NF Forest Plan (USDA FS 2014).The stated purpose of this study was to "determine if current aboveground forest carbon stocks in fire-excluded southwestern ponderosa pine

	Savage, M. and J.N. Mast. How resilient are southwestern ponderosa pine forests after crown fires? Canadian Journal of Forest Research 35: 967-977 (2005). (cited on p. 325) Although cited in the DEIS in support of a statement about carbon emissions, this study does not even contain the word "carbon."	forest are higher than prefire exclusion carbon stocks reconstructed form 1876, quantify the carbon costs of thinning treatments to reduce high-severity wildfire risk, and compare post treatment (thinning and burning) carbon stocks with reconstructed 1876 carbon stocks. "This study is not cited in the DEIS or in the fire ecology report as a reference for the idea that 'burning a forest turns it into a carbon sink' though it does point out that high severity fire can turn a forest into a carbon source. It is cited to support the statement (which we agree with) that fire-excluded forests contain more carbon that non-fire excluded forests. The study supports that idea that these forests are at greater risk of high-severity fire than non-fire excluded forests. No rationale was provided on why the commenter finds conclusions and assumptions in the paper 'questionable". Therefore, no response is possible. The study states, "The carbon carrying capacity of a forest represents the amount of C that can be maintained in the system given climatic conditions and natural disturbance regimes, and barring human disturbance (Keith et al., 2009, 2010). Fire is a natural disturbance in the ponderosa pine forests of the southwestern United States". The next statement explains that fire regimes in southwest ponderosa pine have been altered by human intervention, causing "a transition from frequently, low-severity fire to infrequent, high-severity fire…" This statement is supported by the preponderance of research on fires in southwestern ponderosa pine (see page 38 in the fire ecology report). (183-17) The DEIS at page 59 states: "Closed-canopy, single-storied forest stands are more susceptible to crown fires and changes to fire regimes, as well as long-term conversion from forested plant communities to shrub- and herbaceous-dominated vegetation types (Savage and Mast 2005)." The DEIS at page 155 states, "In 2020, no RUs would meet desired conditions for fire behavior, ranging from 42 percent (RU 1) to 14 percent (RU 6) (table 55). In RU 1, there is potential for 60,000 acres of ponderosa pine to burn with high severity (potential crown fire combined with the potential for high severity surface fire), a subset of which would convert to a nonforested vegetation type (Savage and Mast 2005)." The fire ecology report at page 41 states, "Current conditions inhibit the survival and recruitment of large trees though competition and threaten the maintenance of ecological systems by fueling increasingly extensive crown fires. These fires have
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Firstenberg, Arthur	Finkral, A.J. and A.M. Evans. The effects of a thinning treatment on carbon stocks in a northern Arizona ponderosa pine forest. Forest Ecology and Management 255 (2008) 2743-2750. (cited on p. 327) These authors actually say: "How restoration of fire-adapted forests will affect the balance of carbon stocks remains an open question." Their study area was near Flagstaff, in the region of this project, and they estimated a 2.8% annual risk of fire in the area. This is a 36-year fire rotation, contradicting the frequent-fire assumption that the Forest Service is using to justify burning the area every 5 years.

the potential to alter the successional trajectories of post-burn vegetation creating entirely different communities than those existing before such events (Savage and Mast 2005…)"The fire ecology report at page 66 states, "…It would be expected that some of the ponderosa habitat that burns with high severity would have potential to go through a type conversion, becoming non-forested (Savage and Mast 2005)."The fire ecology report at page 109 states, "High severity fires in ponderosa pine may cause changes to vegetation type/species composition are likely to persist for decades or longer… It is unlikely that many dense stands of ponderosa pine could be sustained for long, so the true "no-action" alternative is extensive mortality through fire or pathogens. Post-mortality biomass may be a different type of ecosystem, such as a persistent shrub type, grass-dominated system, or unnaturally dense ponderosa pine (Savage and Mast 2005)."The fire ecology report at page 111 states, "Where high severity fire occurs in pine/oak, the result in some areas may be persistent oak brush fields where oak and other shrubs are likely to sprout (Ffolliott and Gottfried 1991, Savage and Mast 2005)." The fire ecology report at page 251 states, "Savage and Mast (2005) showed that these conditions can persist for decades." The integrity of a forest structure and species composition is relevant to carbon sequestration and climate change dynamics and has been considered in this analysis.

(183-18) The DEIS at page 327 states: "Mechanical treatment and prescribed burning would help to mitigate the negative impacts of stand-replacing fire in dry, dense forests by consuming less biomass and releasing less carbon into the atmosphere (Finkeral and Evans 2008, Wiedinmyer and Hurteau 2010)."The fire ecology report at page 252 states, "Both thinning and prescribed burning would help to mitigate the negative impacts of stand replacing fire in dry, dense forests, by consuming less biomass and releasing less carbon into the atmosphere (Finkral and Evans 2008)…"The statement, as posed, is intended to set up the relevance of their (Finkeral and Evans) study in the introduction. They discuss some of the research that has been done on restoration and carbon sequestration, and point out that "…dense forests have become a sink for carbon and an offset to the rising concentrations of greenhouse gases in the atmosphere…', but conclude that in a stand-replacing fire, a thinned stand would release 2410 kg C ha_1 less to the

Firstenberg, Arthur	Neary, D.G. et al. Soil Carbon in Aris and Semiarid Forest Ecosystems, 2002. Soil carbon in arid and semiarid forest ecosystems. In: Kimble, J.M., Linda S. Heath,Richard A. Birdsey, and R. Lal, eds. The potential of U.S. forest soils to sequester carbon and mitigate the greenhouse effect. Boca Raton, FL: CRC Press: 293–310. These authors say that "there is considerable concern over the potential to quickly release large quantities of C[arbon] to the atmosphere from forest floor and biomass burning." They cite an analysis by Johnson and Curtis (2001) that "clearly shows that, in the long-term (>10 y[ears]), wildfire increases soil C[arbon] levels due to the sequestration of charcoal and recalcitrant, hydrophobic organic matter." They say: "Current forest management direction in the Intermountain West will result in far greater areas of the forests being treated with prescribed fire than was ever seen in the 20th Century. The net result will be decreases in forest floor, and aboveground biomass, and mineral soil C[arbon] pools." The results, they says, is "a net loss of C[arbon] from atmosphere than an untreated stand. However, the thinning treatment resulted in stand structural changes that make the stand less likely to support a crown fire and therefore more likely to avoid the carbon releases associated with crown fires, even under extreme fire conditions. So the decrease in C released would be even lower. The 2.8% number includes all the successful suppression efforts over the 15 years used to calculate the annual risk (1986 – 2000), and only included fires >50 acres. The actual number of ignitions is much greater than that, and forest conditions that support high severity/high intensity fire have increased in the 14 years since the (Sisk et al. 2004) study was completed. It is unclear where the reference to the 'every 5 years' number comes from. Regardless of the source, fire rotation and 'every 5 years' are not the same thing. Fire rotation is the length of time necessary for an area equal to the entire area of interest to burn. Fire Return Interval (FRI) implied by 'every 5 years') is the period of time between fires at a given point, or the arithmetic average of all fire intervals in a given area over a given time period. The 4FRI analysis does not discuss fire rotation, as it is not relevant to the analysis. The preferred average FRI in the ponderosa pine in the project area is 10 years. This is supported by the preponderance of published scientific literature (see Fire Ecology Report page. 48). (183-19) Page 328 of the DEIS states, "It is important to understand that in order to realize a management based net gain in soil carbon, there must be an increase in carbon entering the soil through a productivity increase over current levels or a decrease in decomposition and erosion (Neary et al. 2002). Productivity in arid forest ecosystems is low due to moisture limitations and the decomposition rates are among the lowest in the continental U.S. (Neary et al 2002), which is true for this project area. It is likely that the forests within the project area have more stored carbon than pre-European settlement due to a change in stored carbon from understory to stand level tree productivity (Neary et al. 2002). As stated above, heavily stocked sites are subject to rapid removal of stored carbon through wildfires. The action alternatives propose removal of overstory through harvest on about 388,000 acres in alternatives B and D, and up to about 434,000 acres in alternative C. This is expected to actually decrease the amount of carbon sequestered over current stand conditions, but the harvest action will convert the

these ecosystems." This is all exactly the opposite of what the DEIS is claiming.

Wiedinmyer, C. and M.D. Hurteau. Prescribed Fire As a Means of Reducing Forest Carbon Emissions in the Western United States. Even this study does not say what the Forest Service wants it to say. These authors caution that "this work does not address important considerations such as the feasibility of implementing wide-scale prescribed fire management or the cumulative emissions from repeated prescribed burning." Not only do the cited studies not support what is claimed, but there is good science, ignored in the DEIS, saying in no uncertain terms that burning the forests contributes to climate change.

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existing stored carbon onsite to belowground storage, thus reducing its potential loss from wildfire (Neary et al. 2002).Mechanical vegetation treatments (proposed under the action alternatives) would improve soil condition and productivity for soil infiltration and nutrient cycling because an increase in grass species corresponds to a larger root network essential in loosening up and improvement of soil structure and promotes better water infiltration, air exchange, and soil microbial cycling of nutrients, thus improving the ability of the soil to store water which would mitigate the potential loss of overall net precipitation that is expected with climate change. Decomposition rates are also likely to increase with a grass/forb ecosystem compared to a lignin based forest ecosystem, so there may be an increased loss of soil carbon after treatments as the site transitions to a grass/forb understory. Erosion is expected to decrease across the site with the removal of 900 miles of roads and the reduced risk of stand-replacing wildfires and the expected increase in soil productivity, thus potentially increasing carbon storage onsite. Neary et al. (2002) suggests that "perhaps the best carbon sequestration strategy in these inherently low productivity ecosystems is to return their structures to within their historical range of variability". The action alternatives would move toward a more sustainable carbon sequestration scenario for the project area, especially for soil carbon. Carbon sequestration is a means to counter expected human impacts that exacerbate climate change."

(183-20) The DEIS at page 327 states: "Mechanical treatment and prescribed burning would help to mitigate the negative impacts of stand-replacing fire in dry, dense forests by consuming less biomass and releasing less carbon into the atmosphere (Finkeral and Evans 2008, Wiedinmyer and Hurteau 2010)." The fire ecology report at page 252 states, "Both thinning and prescribed burning would help to mitigate the negative impacts of stand replacing fire in dry, dense forests, by consuming less biomass and releasing less carbon into the atmosphere (Finkral and Evans 2008, Wiedinmyer and Hurteau 2010). They found that while the treatment initially produced a 30% reduction in the carbon held in trees, it significantly reduced the threat of an active crown fire, which they predicted would kill all the trees and release 3.7 tons of carbon per acre in any untreated areas. " The fire ecology report at page 303 states, "Prescribed burning helps to mitigate the negative

		impacts of stand-replacing fire in dry, dense forests by consuming less biomass and releasing less carbon into the atmosphere (Wiedinmyer and Hurteau 2010).”Wiedinmyer and Hurteau (2010) begin their abstract with the following: “Carbon sequestration by forested ecosystems offers a potential climate change mitigation benefit. However, wildfire has the potential to reverse this benefit. In the western United States, climate change and land management practices have led to increases in wildfire intensity and size. One potential means of reducing carbon emissions from wildfire is the use of prescribed burning, which consumes less biomass and therefore releases less carbon to the atmosphere.” The commenter states, “Although this work does not address important considerations such as the feasibility of implementing wide-scale prescribed fire management or the cumulative emissions from repeated prescribed burning, it does provide constraints on potential carbon emission reductions when prescribed burning is used.” The literature is conclusive and states, “Wide-scale prescribed fire application can reduce CO2 fire emissions for the western U.S. by 18-25% in the western U.S., and by as much as 60% in specific forest systems.” The conclusions of this study support the actions proposed in the 4FRI EIS and were not cited in relation to operations/ implementation.
Firstenberg, Arthur	Sebastiaan Luyssaert et al., Old-growth forests as global carbon sinks, Nature 455: 213-215 (2008), says that forests up to 800 years old, if left alone, remain net carbon sinks. Campbell, J.L. et al., Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Frontiers in Ecology and the Environment 10:83-90 (2012), concludes that ten acres must be treated with prescribed fire to prevent one acre from burning in a wildfire, and therefore that prescribed fire, if practiced on a large scale, is a significant source of carbon emissions contributing to climate change.	(183-21) Sebastiaan et al. 2008 discusses old growth forests and forests up to 800 years old, if left alone, remain net carbon sinks. Unfortunately, the caveat ‘if left alone’ is highly pertinent to the 4FRI landscape. In the last 100 – 150 years grazing, fire suppression, and logging have significantly decreased the resilience of this landscape to natural disturbances, including wildfire. This study generalizes conditions across the globe, and is not sufficiently site specific, or vegetation type specific to be useful for this analysis. This study is not relevant to the project. Campbell et al. 2012 evaluated the effects of fuel treatments and wildfire on forest C stocks. With the exception of 535 acres of fuel reduction in a WUI area, the 4FRI is proposing restoration treatments, not fuel treatments. They state: “…removing fine canopy fuels (i.e. leaves and twigs) practically necessitates removing the branches and boles to which they are attached, conventional fuel-reduction treatments usually remove more C from a forest stand than would a wildfire burning in an untreated stand…” The

	THE DEIS IS SELF-CONTRADICTORY On page v, the DEIS says that Alternative C responded to public concern about preserving large trees. Yet Alternative C would remove trees up to 18 inches in diameter, compared to only 16 inches in the other alternatives. It	
Firstenberg, Arthur	would also burn more acres and mechanically thin more acres than the other alternatives.	
	On page iii, it is said that more trees means "reduced ground cover," causing springs to dry up. But trees and their roots are ground cover and hold moisture. Removing them will cause springs to dry up, just the opposite of what it says in the DEIS. The DEIS goes so far as to say	
Firstenberg, Arthur	that closed forest canopies increase evaporation from trees (p. 111), drying out the forest. In other words, black is white. The truth is that	

treatments proposed in the 4FRI are not at all 'conventional fuel-reduction' treatments. They are restoration treatments which are designed to produce and/or promote multi-story/multi-age stands. Campbell et al. state that: "A full accounting of C would also include the fossil-fuel costs of conducting fuel treatments, the longevity of forest products removed in fuel treatments, and the ability of fuel treatments to produce renewable "bioenergy", potentially offsetting combustion of fossil fuels." They go on to describe limits on the potential contributions of fossil fuel costs, forest products, and biofuels. Other research efforts (Finkral and Evans 2008, Bagdon and Huang 2014, Hurteau and North 2009, Hurteau et al. 2008, Sorensen et al. 2011).

(183-22) There is no contradiction. The DEIS displays the current condition in terms of vegetation structure in both goshawk and MSO habitat. For example, table 12 in the DEIS displays the existing size class distribution in goshawk LOPFA habitat. Trees in the VSS 5 stage occur on 8% to 14% of the project area. This is deficit when compared to the desired condition. Trees that are 24" and greater are only found on about 1 percent of even-aged stands and on about 17% of uneven-aged stands. Post-treatment large and old tree conditions are discussed throughout the EIS. Large trees in MSO habitat are described as being the average trees per acres 18 inches and larger. Page 140 of the DEIS states, "The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation". Table 47 on page 137 of the DEIS compares the average trees per acre 18" or larger in MSO habitat. In protected habitat, alternative C provides a slight increase in trees 18" or greater than alternative B.

(183-24) There is no contradiction. If surface fuel loading, etc. were the same, we would agree there can be more intense fire in an area that is thinned. The fire ecology report states on pages 28 and 29, "Reducing canopy fuel loading may increase surface fire behavior because more wind and sunlight can reach the surface, however overall fire behavior is more significant. "Modifying canopy fuels as prescribed in this

	"Removing canopy trees leads to a hotter, drier, windier microclimate." (William L. Baker, Forest Ecology in Rocky Mountain Landscapes, Island Press, Washington, D.C., 2009, p. 373). Thinning closed-canopy forests leads to higher fire intensity because of lower fuel moisture and higher wind speed. (R.V. Platt et al. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Association of American Geographers 96:455-70 (2006).	method may lead to increased surface fire intensity and spread rate under the same environmental conditions, even if surface fuels are the same before and after canopy treatment. Reducing CBD to preclude crown fire leads to increases in the wind adjustment factor (the proportion of 20-ft wind speed that reaches midflame height). Also, a more open canopy may lead to lower fine dead fuel moisture content. These factors increase surface fire intensity and spread rate. Therefore, canopy fuel treatments reduce the potential for crown fire at the expense of slightly increased surface fire spread rate and intensity. However, critical levels of fire behavior (limit of manual or mechanical control) are less likely to be reached in stands treated to withstand crown fires, as all crown fires are uncontrollable. Though surface intensity may be increased after treatment, a fire that remains on the surface beneath a timber stand is generally controllable" (Scott 2003). However, following prescribed fire, surface fuel loading would be lower, effectively decreasing the potential fire intensity."
Firstenberg, Arthur	Removing half the volume of a western white pine stand in northern Idaho lowered fuel moisture by about one-third (L.G. Hornby. Fuel type mapping in Region One. Journal of Forestry 33:67-71 (1935), increased wind speed six- to ten-fold, and increased the number of critical fire days four-fold (G.M. Jemison. The significance of the effect of stand density upon the weather beneath the canopy. Journal of Forestry 32:446-51 (1934)). No published science supports the Forest Service's misguided opinion.	(183-25) Thank you for your comments. See our response to comment 183-25 and please read the fire ecology analysis in the DEIS from page 149 to page 173. (183-26) There is no contradiction. Bullet 4 on page xi of the DEIS actually states the following: "Reducing stand density below the density related mortality zone (less than 56 percent of maximum stand density index (SDI) in all goshawk habitat and in restricted MSO habitat;" Higher density will be retain in MSO protected, threshold and target habitat and this is discussed on page 182 of the DEIS. In the vegetation section of the DEIS pages 126-131, displays and discusses how the SDI relates to providing for goshawk habitat by alternative. Page 13 of the DEIS explains that SDI is a relative measure of stand density based on trees per acre and mean diameter. Mortality is likely to occur when the SDI is over 60 percent of maximum stand density. Dense forest does not equate to habitat for the MSO and goshawk. Forest that have an over abundant of small trees with few or no large trees can have a high
Firstenberg, Arthur	On page xi, purpose number 4 of the project is to "reduce[e] stand density" in goshawk and spotted owl habitat, even elsewhere it is stated that these species depend on dense forests for their survival.	

Firstenberg, Arthur	On page xii, it is said that although Abert's squirrel and tassel-eared squirrel habitat will be diminished in the short term, it will be increased in the long term. This contradicts what is said on page xi, i.e. that closed canopy conditions will never (at least not before 2050) be permitted to return.	density number, but does not provide habitat for these species. (183-27) Please note, the Abert's squirrel and tassel-eared squirrel is the same species. The Kaibab NF uses tassel-eared since it has two different subspecies. For this analysis the Abert's squirrel was used for both forest analyses. The wildlife specialist report (pages 411-413) has the documentation to support the determination of short term negative effects and long term improvement once treatments areas move toward desired condition based on the amount of squirrel habitat on each forest that is within the treatment areas and development of clumps of habitat with closed canopy developed across the landscape (desired conditions). The statement the commenter is referring to on page ix (of the DEIS) is that in the short term that fire regime condition class (FRCC) would move desired levels at the project area scale but in the long term (2050), over 50% of the project area in alternative D would revert to FRCC 3. Page 25 of the DEIS explains that FRCC is a coarse-scale evaluation protocol. The FRCC assessments determine how departed a landscape's fire regime is from its historic fire regime. It is scaled from 1 to 3, with 3 being the most departed and 1 being the least departed. This does not relate to how squirrel habitat would be retained within stands.
Firstenberg, Arthur	On page xii, it is said there will be "no measurable effects to migratory bird populations." This defies common sense. Inevitably, birds will be killed by fire. Converting half the forest to meadows will diminish their habitat.	(183-28) The wildlife specialist report (pages 429-434) fully discloses the reason for the determination of "no measurable negative effects to migratory bird population" by species. The determinations by species are based on the amount of habitat across the range of the species, mitigations and design measure established for the project, and timing of activities. The project is not converting half the forest to meadows. Chapter 2 of the DEIS shows by alterative how many acres would be treated for either grassland restoration or savanna treatments; alterative B (page 70-71) and alterative D (page 89) would treat 56,654 acres; and alterative C (pages 82-83) would treat 104,853 acres. The grassland restoration and savanna treatment acres are to restoring historic grasslands and savannas; this will benefit grassland and savanna bird species.
Firstenberg, Arthur	from the project, which contradicts what is said in Appendix G, i.e. that some song birds will need "bridge habitat" to survive at all.	(183-29) The wildlife specialist report (pages 434-435) discloses the reasons for the determination that the important bird area would benefit from the project. Page 699 of the DEIS states that Appendix G clarifies how post-treatment conditions within the project area would

Firstenberg, Arthur	On page xii, it is said that “individual tree growth would improve, increase[ing] carbon storage over time.” This contradicts page xi, which implies that up to half the biomass in the forest will be removed permanently (or at least until 2050) and not be allowed to grow back.	provide for canopy-dependent wildlife in the short term. These areas are referred to as “bridge habitat”, suggesting that these more densely forested areas would be available to wildlife to bridge the time between treatment and the attainment of desired conditions across the broader landscape. (183-30) The DEIS is not contradictory. The purpose and need indicates approximately 74 percent of the ponderosa pine forest type within the project area is departed from historical reference conditions (DEIS, page 9). For example, in goshawk habitat (outside of PFAs), in all stands the young and mid-aged forest structural stages are surplus, and the grass/forb/shrub, seedling/sapling, mature, and old forest stages are deficit (DEIS, page 12). The post treatment condition does not the remove the forested condition, i.e., convert the forests to grasslands. It provides for a more balanced diversity of tree size/age classes. A good example of post treatment conditions is displayed for MSO and goshawk habitat. See response to comment #25 which discusses post treatment conditions in MSO and goshawk habitat. The DEIS (page 327-328) states, “Under projected, future climate conditions, restoration treatments (e.g., mechanical treatment, prescribed fire) in alternatives B, C, and D would promote low-density stand structures, characterized by larger, fire-resistant trees (see silviculture specialist report). Mechanical treatment and prescribed burning would help to mitigate the negative impacts of stand-replacing fire in dry, dense forests by consuming less biomass and releasing less carbon into the atmosphere (Finkeral and Evans 2008, Wiedinmyer and Hurteau 2010). Some of the carbon within the estimated 366,159,029 cubic feet (alternative B) to 367,737,165 cubic feet (alternative C) of biomass removed by mechanical thinning would be sequestered for a time in the form of building materials (silviculture specialist report). This assertion is supported by Ryan et al. (2010) who found that wood products which substitute standard building materials such as steel and concrete produce far less greenhouse gas emissions during their production while simultaneously sequestering carbon (Fire Ecology Report). Finkeral et al. found that while the treatment initially produced a 30 percent reduction in the carbon held in trees, it significantly reduced the threat of an active crown fire, which they predicted would kill all the trees and release 3.7 tons of carbon per acre in any untreated areas”.

Firstenberg, Arthur	On page 180, it is said that "Canopy cover in habitat selected by M[exican] S[potted] O[wl] is higher than the average forest values and can range from 50 percent to greater than 80 percent. There is decreased quality in prey habitat due in part to uncharacteristic canopy connectivity from ingrowth of smaller trees inhibiting herbaceous understory development." This passage contradicts itself. Is the Forest Service really saying that the stupid spotted owl doesn't know what is good for it, and is idiotically choosing these closed canopy forests even though they are bad for it?	(183-31) Both statements are correct. The 2012 Revised MSO Recovery Plan (USFWS 2012; page 275-275) list what is the desired condition for cover types typically used by MSO. One component is to strive for a diversity of patch size with the minimum contiguous patch size 2.5 acres. Strive for between patch heterogeneity. Other components listed are diverse composition of vigorous native herbaceous and shrub species. Opening sizes between 0.1-2.5 acres. Small canopy gaps within forested patches provide for prey habitat diversity. As noted on page 179 of the DEIS, there is an imbalance in tree size classes leading to a lack of diversity in tree ages and structural diversity.
Firstenberg, Arthur	On page 180, it is said that in the no-action alternative, "understory development would remain suppressed and continue to decline." This contradicts page 187, which emphasizes that "ladder fuels," i.e. understory development, need to be eliminated. Which is it? Is there too much or too little understory development under current conditions?	(183-32) Ladder fuels and understory are not equivalent. Ladder fuels are any fuels that can provide sufficient fire intensity (flame lengths) for a surface fire to transition into a crown fire. 'Understory', in this case (page 180), refers to the herbaceous understory and will be changed to clarify the intent.
Firstenberg, Arthur	On page 181, it is stated that impacts on spotted owls will be mitigated because "not all MSO habitats are treated simultaneously." This is contradicted by page vi, which states that every area will be treated every five years—practically simultaneous, when it comes to destruction of habitat. On page 181, it is stated that spotted owls will be protected by "retaining dense stands with closed canpies," contradicting what was just said on page 180 about the need to thin out the canopy for the spotted owls' welfare.	(183-33) The statement on page 181 of the DEIS is describing the how the road maintenance, reconstruction, temporary road construction, and decommissioning within PACS. This bullet on page vi is referring to the burn areas being burned twice in a 10 year period. Burns within MSO habitat would be with timing restrictions and with low-severity burn prescriptions. This would not cause the destruction of habitat. The biological opinion issued by the FWS on October 20, 2014 will be available on the project website and is an appendix in the wildlife specialist report.
Firstenberg, Arthur	On page 182, it is said that "all alternatives would increase trees greater than 18 inches d.b.h." How? If the plan is to remove all trees smaller than 18 inches, the number of trees greater than 18 inches is not going to increase. On page 182, it is said that "Ponderosa pine basal area would decrease in all action alternatives, which is a treatment objective." But Ponderosa pine is the largest and most common tree in the project area. If the goal is to decrease the biomass contained in Ponderosas, and since smaller trees will never have as much biomass, then the goal of the project is to decrease carbon storage in the forest, which contradicts the entire discussion about carbon and climate change.	(183-34) Please see our previous responses.
Firstenberg,	On page 183, it is said that snags greater than 18 inches would	(183-35) Page 183 of the DEIS addresses the removal of snags during

Arthur	decrease under alternatives B, C, and D, contradicting what was said on page 180, i.e. that the project would increase the amount of snags, benefiting wildlife.	project activities such as thinning and burning. The discussion on page 180 is that by doing project activities this will help in the development of large trees by removing the density dependent competition from smaller trees. These would be large snags in the future. There is no contradiction between the two pages.
Firstenberg, Arthur	These comments are submitted in response to the March 29, 2013 notice in the Federal Register, 78 FR 19261, requesting public comment before May 29, 2013 on EIS No. 20130076, the Draft Environmental Impact Statement ("DEIS") for the Four Forests Restoration Initiative ("4FRI"). These comments are submitted in accordance with the agency's obligations under the National Environmental Policy Act's ("NEPA") regulations at 40 C.F.R. § 1503.1(a)(4). In accordance with 40 CFR 1503.3(a), they address both the adequacy and the merits of the DEIS. I.VIOLATION OF FEDERAL LAWS AND REGULATIONS A.NATIONAL ENVIRONMENTAL POLICY ACT 1. 42 USC § 4331(b)(2) It is the "responsibility of the Federal Government to use all practical means… to… assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings." The DEIS identified effects of smoke and particulate matter on "individuals with chronic obstructive pulmonary or cardiovascular disease of influenza, asthmatics, the elderly, and children" (at p. 166), without identifying any methods for mitigating these effects and ensuring a safe and healthful environment. 2. 40 CFR 1502.16(h) The DEIS must include "means to mitigate adverse environmental impacts—here, impacts on these sensitive populations. The DEIS may not just say there will be impacts without saying how they will be mitigated. 3.40 CFR 1502.14(f) Regarding these sensitive populations, The DEIS must, but does not, "include appropriate mitigation measures not already included in the proposed action or alternatives." 4. 42 USC 4332(C)(iv) The EIS must include information on "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity." This project will convert forests into "groups of trees mixed with interspaces" by permanently removing around half the biomass of the project area, providing enormous quantities of wood products during the first ten years. Obviously such productivity cannot be sustained. The DEIS does not provide the	(109-1) This letter is a duplicate. The complete response can be found with letter #183.

required information about how this will enhance long-term productivity. 5.40 CFR 1508.7, 40 CFR 1508.25(a)(2), 40 CFR 1508.25(c), 40 CFR 1508.27(b)(7). These sections all require consideration of cumulative impacts and prohibit segmentation, i.e. breaking a large action "into small component parts." The DEIS addresses only cumulative impacts of actions within the Coconino and Kaibab National Forests, but not the cumulative impact of all of the actions in the Collaborative Forest Landscape Restoration Program. Each of the individual projects in the program is a "small component part" of the whole program, with cumulative impacts on climate change, air quality, public health, migrating birds, threatened and endangered species, and other environmental factors. The Forest Service is ignoring these cumulative, nationwide impacts through illegal segmentation. 6.40 CFR 1502.24, "METHODOLOGY AND SCIENTIFIC ACCURACY" "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." This DEIS is in flagrant violation of scientific integrity and accuracy. The DEIS references numerous scientific studies in support of conclusions that those studies do not support, and even contradict. The DEIS is internally inconsistent, self-contradictory, and full of completely outlandish statements. B.HEALTHY FORESTS RESTORATION ACT OF 2003 "Not more than a total of 20,000,000 acres of Federal land may be treated under authorized hazardous fuel reduction projects." 16 U.S.C. § 6512(c). Since the passage of this Act, about 20,000,000 acres of Federal land have already been included in hazardous fuel reduction projects. This project is authorized by 16 U.S.C. 7303, which established the Collaborative Forest Landscape Restoration Program, requiring all ecological restoration treatments to be conducted in accordance with "(1) the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.); (2) the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.); and (3) any other applicable law." The law prohibiting the burning of more than 20,000,000 acres of Federal land under authorized fuel reduction projects has not been repealed, and must be complied with. Furthermore, the request for comments on the DEIS sent out by the Forest Service states that "Comments must meet the requirements of 36 CFR 218.22." 36 CFR 218 are

regulations implementing the Healthy Forests Restoration Act. The rest of that Act must be complied with, including the limit on acreage burned. C.REHABILITATION ACT OF 1973 “No otherwise qualified individual with a disability in the United States, as defined in section 705(20) of this title, shall, solely by reason of her or his disability… be subjected to discrimination under any program or activity conducted by any Executive agency.” 29 U.S.C. § 794(a). This project will discriminate against persons disabled with multiple chemical sensitivity (“MCS”), who cannot tolerate, or even remain in their homes, when impacted by smoke and chemical emissions from fires. The DEIS is inadequate, and in violation of the Rehabilitation Act, in wholly failing to address or even mention, let alone mitigate, impacts on persons with this disability of repeated and continual burning. D.MIGRATORY BIRD TREATY, 16 U.S.C., CHAPTER 7 The DEIS’s treatment of migratory birds on pages 239-243 is wholly inadequate, full of conclusory statements (“There would be no measurable negative effects to migratory bird populations”) that are not supported by any scientific studies, and utterly fails to address cumulative, nationwide impacts. The DEIS states that the project will kill an unspecified number of migratory birds (p. 243), and will otherwise reduce their habitat, and does not comply with the requirements of 16 U.S.C. § 704 regarding the taking and killing of such birds. E.ENDANGERED SPECIES ACT The DEIS’s treatment of endangered species is wholly inadequate, and does not comply with the requirements of 16 U.S.C. § 1539 regarding the taking of endangered species. For example, the preferred alternative proposes to burn 98 percent of protected Mexican Spotted Owl habitat within the project area, which will have “adverse effects on individual owls” (p. 181) due to fire, smoke, loss of habitat, and other project activities. II.ALTERNATIVES B, C, AND D WILL BE DISASTROUS FOR MEXICAN SPOTTED OWLS. All the alternatives will involve severe thinning of owl habitat, eliminating most closed canopies, when the owls required a closed canopy to reproduce. The preferred alternative proposes to burn 35,566 out of 36,455 acres of owl habit, including 6 critical habitat units. III.THE DEIS FAILS TO ADDRESS THE IMPACT OF HERBICIDES All the alternatives, says the DEIS, will increase noxious weed growth (p. 258). Not to worry, says the Forest

Service: amendments 20 (Coconino NF) and 7 (Kaibab NF) have allowed the use of herbicides to control them (p. 259). But the DEIS is then required to address the massive use of herbicides that this project would entail by encouraging noxious weeds to proliferate over half a million acres of forest land, and the impacts of those herbicides on animals, plants, waterways, and humans living in and around the project area. IV.THE DISCUSSION OF "BRIDGE HABITAT" IS INADEQUATE AND INCOMPREHENSIBLE The DEIS (p. 174) proposes that species that need a closed canopy, including the northern goshawk, the Mexican Spotted Owl, Abert's squirrel, turkey, mule deer, black bear, and some songbird species, will all be able to flee the areas that are thinned and burned and congregate in the 17 percent of the forest that is left in closed canopy until they learn to "adjust, adapt, or eventually relocate." No science whatever is cited for this absurd and patently wrong notion that species that have never been able to survive outside of a closed canopy will learn to do so over a period of five or ten years! Nor has any thought been given as to exactly where all this wildlife are supposed to be able to "relocate" in the event that they do not in fact "adjust" or "adapt." This is why addressing cumulative, nationwide impacts is so important, and why the failure of the Forest Service to do so invalidates the DEIS. It is the policy of the Forest Service to eliminate closed canopies everywhere in the country.There simply will be nowhere for the animals (the ones that survive the initial fire-bombing) to go. If only 17 percent of the forest is left in closed canopy (p. 174), then the carrying capacity of the land will ensure that only 17 percent of those animals are left also. The stated policy of the Forest Service is to permanently thin the forest, to burn every five years to ensure that a closed canopy never returns, and to maintain such conditions at least until 2060 (p. 324). This is explicitly stated in the DEIS: "Long term (2040 to 2060), high priority strategic recommendations… include[] thinning to create a mosaic of clumps and groups of trees with intermixed openings, treating more acres with prescribed burns, and allowing more wildland fire to burn." The stated goal of the Forest Service is to replace forests with "a mosaic of interspaces and tree groups on 41 to 44 percent of treatment acres" (p. xi), and to maintain such conditions for at least the next

fifty years. V.THE DEIS DOES NOT ADDRESS THE IMPACT OF ESCAPED PRESCRIBED BURNS. All the existing literature says that between one-half of one percent and two percent of all prescribed burns escape control. The EIS must document the frequency, acreage, and intensity of escaped burns in the past, their probable frequency and extent in the future, and their impacts, especially considering the unprecedent scale of planned burning in this and other current and future projects. VI.THE CONCLUSIONS ABOUT CARBON AND CLIMATE CHANGE ARE CONTRARY TO COMMON SENSE AND CONTRADICTED BY THE SCIENCE CITED Seven studies are referred to in support of the incredible claim that burning forests makes them into carbon sinks, while not burning them makes them into carbon sources. 1. Woods, K.W. et al. 2012. Carbon Commodities Funding Forest Restoration Draft Report. Prepared for M. Selig. Grand Canyon Trust. (cited on page 323) This is a draft of an unpublished report—not even a study—that is unavailable and is apparently based on Hurteau and North 2009 (below). 2. Hurteau, M. and M. North 2009. Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios. (cited on page 328) This is a study from the moist Sierra Nevada, not the dry Southwestern desert, and its conclusion at any rate is the opposite of what the DEIS claims, because the DEIS fails to consider soil carbon. “When totaled over a century and added to the wildfire emissions, total released C[arbon] was greater than in the non-burn treatments,” say Hurteau and North. “Current C[arbon] accounting practices can be at odds with efforts to reduce fire intensity,” they say. 3. Hurteau, M. et al. The carbon costs of mitigating high-severity wildfire in southwestern ponderosa pine. Global Change Biology (2011) 17:1516-1521. (cited on p. 325) All this study claims to say is that there is 2.3 times as much carbon in our forests today than there was in 1876, and that therefore we can afford to remove half the carbon from today’s forests to restore “original” conditions—a questionable conclusion based on questionable assumptions about conditions in 1876, and one that does not say that burning a forests turns it into a carbon sink. 4. Savage, M. and J.N. Mast. How resilient are southwestern ponderosa pine forests after crown fires? Canadian Journal of Forest Research 35: 967-977 (2005). (cited on p. 325) Although cited in the

DEIS in support of a statement about carbon emissions, this study does not even contain the word “carbon.” 5. Finkral, A.J. and A.M. Evans. The effects of a thinning treatment on carbon stocks in a northern Arizona ponderosa pine forest. Forest Ecology and Management 255 (2008) 2743-2750. (cited on p. 327) These authors actually say: “How restoration of fire-adapted forests will affect the balance of carbon stocks remains an open question.” Their study area was near Flagstaff, in the region of this project, and they estimated a 2.8% annual risk of fire in the area. This is a 36-year fire rotation, contradicting the frequent-fire assumption that the Forest Service is using to justify burning the area every 5 years. 6. Neary, D.G. et al. Soil Carbon in Aris and Semiarid Forest Ecosystems, 2002. Soil carbon in arid and semiarid forest ecosystems. In: Kimble, J.M., Linda S. Heath,Richard A. Birdsey, and R. Lal, eds. The potential of U.S. forest soils to sequester carbon and mitigate the greenhouse effect. Boca Raton, FL: CRC Press: 293–310. These authors say that “there is considerable concern over the potential to quickly release large quantities of C[arbon] to the atmosphere from forest floor and biomass burning.” They cite an analysis by Johnson and Curtis (2001) that “clearly shows that, in the long-term (>10 y[ears]), wildfire increases soil C[arbon] levels due to the sequestration of charcoal and recalcitrant, hydrophobic organic matter.” They say: “Current forest management direction in the Intermountain West will result in far greater areas of the forests being treated with prescribed fire than was ever seen in the 20th Century. The net result will be decreases in forest floor, and aboveground biomass, and mineral soil C[arbon] pools.” The results, they says, is “a net loss of C[arbon] from these ecosystems.” This is all exactly the opposite of what the DEIS is claiming. 7. Wiedinmyer, C. and M.D. Hurteau. Prescribed Fire As a Means of Reducing Forest Carbon Emissions in the Western United States. Even this study does not say what the Forest Service wants it to say. These authors caution that “this work does not address important considerations such as the feasibility of implementing wide-scale prescribed fire management or the cumulative emissions from repeated prescribed burning.” Not only do the cited studies not support what is claimed, but there is good science, ignored in the DEIS, saying in no uncertain terms that burning the forests

contributes to climate change. Sebastiaan Luyssaert et al., Old-growth forests as global carbon sinks, Nature 455: 213-215 (2008), says that forests up to 800 years old, if left alone, remain net carbon sinks. Campbell, J.L. et al., Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Frontiers in Ecology and the Environment 10:83-90 (2012), concludes that ten acres must be treated with prescribed fire to prevent one acre from burning in a wildfire, and therefore that prescribed fire, if practiced on a large scale, is a significant source of carbon emissions contributing to climate change. VI. THE DEIS IS SELF-CONTRADICTORY On page v, the DEIS says that Alternative C responded to public concern about preserving large trees. Yet Alternative C would remove trees up to 18 inches in diameter, compared to only 16 inches in the other alternatives. It would also burn more acres and mechanically thin more acres than the other alternatives. On page iii, it is said that more trees means "reduced ground cover," causing springs to dry up. But trees and their roots are ground cover and hold moisture. Removing them will cause springs to dry up, just the opposite of what it says in the DEIS. The DEIS goes so far as to say that closed forest canopies increase evaporation from trees (p. 111), drying out the forest. In other words, black is white. The truth is that "Removing canopy trees leads to a hotter, drier, windier microclimate." (William L. Baker, Forest Ecology in Rocky Mountain Landscapes, Island Press, Washington, D.C., 2009, p. 373). Thinning closed-canopy forests leads to higher fire intensity because of lower fuel moisture and higher wind speed. (R.V. Platt et al. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Association of American Geographers 96:455-70 (2006). Removing half the volume of a western white pine stand in northern Idaho lowered fuel moisture by about one-third (L.G. Hornby. Fuel type mapping in Region One. Journal of Forestry 33:67-71 (1935), increased wind speed six- to ten-fold, and increased the number of critical fire days four-fold (G.M. Jemison. The significance of the effect of stand density upon the weather beneath the canopy. Journal of Forestry 32:446-51 (1934)). No published science supports the Forest Service's misguided opinion. The only study cited in the

DEIS for this is J.M. Bosch and J.D. Hewlett, A review of catchment experiments to determine the effect of vegetation of vegetation changes on water yield and evapotranspiration, Journal of Hydrology 55:3-23 (1982). This is a study of catchments, i.e. how much water collects in reservoirs in forested versus denuded areas. In densely forested land, most rainfall is absorbed into the ground and the vegetation. In clearcut areas, all the water runs off into the streams and reservoirs, filling them up. The forest dries out, and the reservoirs fill up. On page xi, purpose number 4 of the project is to "reduce[e] stand density" in goshawk and spotted owl habitat, even elsewhere it is stated that these species depend on dense forests for their survival. On page xii, it is said that although Abert's squirrel and tassel-eared squirrel habitat will be diminished in the short term, it will be increased in the long term. This contradicts what is said on page xi, i.e. that closed canopy conditions will never (at least not before 2050) be permitted to return. On page xii, it is said there will be "no measurable effects to migratory bird populations." This defies common sense. Inevitably, birds will be killed by fire. Converting half the forest to meadows will diminish their habitat. On page xii, it is said that "important bird areas" will "benefit" from the project, which contradicts what is said in Appendix G, i.e. that some song birds will need "bridge habitat" to survive at all. On page xii, it is said that "individual tree growth would improve, increase[ing] carbon storage over time." This contradicts page xi, which implies that up to half the biomass in the forest will be removed permanently (or at least until 2050) and not be allowed to grow back. On page 180, it is said that "Canopy cover in habitat selected by M[exican] S[potted] O[wl] is higher than the average forest values and can range from 50 percent to greater than 80 percent. There is decreased quality in prey habitat due in part to uncharacteristic canopy connectivity from ingrowth of smaller trees inhibiting herbaceous understory development." This passage contradicts itself. Is the Forest Service really saying that the stupid spotted owl doesn't know what is good for it, and is idiotically choosing these closed canopy forests even though they are bad for it? On page 180, it is said that in the no-action alternative, "understory development would remain suppressed and continue to decline." This contradicts page 187,

	which emphasizes that “ladder fuels,” i.e. understory development, need to be eliminated. Which is it? Is there too much or too little understory development under current conditions? On page 181, it is stated that impacts on spotted owls will be mitigated because “not all MSO habitats are treated simultaneously.” This is contradicted by page vi, which states that every area will be treated every five years—practically simultaneous, when it comes to destruction of habitat. On page 181, it is stated that spotted owls will be protected by “retaining dense stands with closed canpies,” contradicting what was just said on page 180 about the need to thin out the canopy for the spotted owls’ welfare. On page 182, it is said that “all alternatives would increase trees greater than 18 inches d.b.h.” How? If the plan is to remove all trees smaller than 18 inches, the number of trees greater than 18 inches is not going to increase. On page 182, it is said that “Ponderosa pine basal area would decrease in all action alternatives, which is a treatment objective.” But Ponderosa pine is the largest and most common tree in the project area. If the goal is to decrease the biomass contained in Ponderosas, and since smaller trees will never have as much biomass, then the goal of the project is to decrease carbon storage in the forest, which contradicts the entire discussion about carbon and climate change. On page 183, it is said that snags greater than 18 inches would decrease under alternatives B, C, and D, contradicting what was said on page 180, i.e. that the project would increase the amount of snags, benefiting wildlife. CONCLUSION This DEIS appears to be simply a pro forma rationalization for a foregone conclusion. The Forest Service is not ashamed to fill its statutorily required document with absurd, contradictory statements unjustified by science that defy common sense in order to get on with a project that will benefit the wood products industry but no one else. The DEIS satisfies neither the letter nor the spirit of the National Environmental Quality Act. Alternative A, no action, is the only alternative action that is justified, and should be the one chosen. 6.40 CFR 1502.24, “METHODOLOGY AND SCIENTIFIC ACCURACY” “Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements.” This DEIS is in flagrant violation of scientific integrity	
Firstenberg, Arthur		(183-36) Thank you for your comments. We have responded (below) where specific references were included.

Firstenberg, Arthur	and accuracy. The DEIS references numerous scientific studies in support of conclusions that those studies do not support, and even contradict. The DEIS is internally inconsistent, self-contradictory, and full of completely outlandish statements. The only study cited in the DEIS for this is J.M. Bosch and J.D. Hewlett, A review of catchment experiments to determine the effect of vegetation of vegetation changes on water yield and evapotranspiration, Journal of Hydrology 55:3-23 (1982). This is a study of catchments, i.e. how much water collects in reservoirs in forested versus denuded areas. In densely forested land, most rainfall is absorbed into the ground and the vegetation. In clearcut areas, all the water runs off into the streams and reservoirs, filling them up. The forest dries out, and the reservoirs fill up. CONCLUSION This DEIS appears to be simply a pro forma rationalization for a foregone conclusion. The Forest Service is not ashamed to fill its statutorily required document with absurd, contradictory statements unjustified by science that defy common sense in order to get on with a project that will benefit the wood products industry but no one else. The DEIS satisfies neither the letter nor the spirit of the National Environmental Quality Act.	(183-37) This is not an accurate statement. See previous responses.
Firstenberg, Arthur	Alternative A, no action, is the only alternative action that is justified, and should be the one chosen.	(183-38) Thank you for expressing your opinions.
Fish, Mary	Excuse me, but this plan is nuts. I mean insane, irrational, warped and delusional! Without tree cover the aquifers will dry up and we'll loose the lower half of the hydrological cycle so necessary for life on our blue planet. Obviously, as well, burning the forests which sequester carbon will result in huge releases of carbon and other gasses into the earths atmosphere, which is already exponentially overloaded with greenhouse gasses, in excess of conditions which precipitated, or at least preceded, the last ICE AGE! Not to mention that these national forests are for the use and pleasure of all Americans, not just the logging companies who will exploit them for private sector profits, nor out of touch policymakers who never learned the lesson from the fairy tale, "The Emperor's New Clothes". This proposal lacks even the most rudimentary common sense, it is a bad idea, the environmental impact will be devastating, and protected species will be massacred. What an ugly vision this project	(94-1) Thank you for your comment. The purpose and need for this restoration project may be found on page 8 of the DEIS.

	creates, it is sad that this is the 'solution' you've pictured for the problem you're trying to remedy - its like applying massive radiation that will melt body parts to try to kill a cancerous tumor. There is no thought of the patient as a whole being, of the forest as a whole system - a whole living loving system growing from the body of the earth.	
Fleishman, Dick	This is a test. attached is a document that guides you how to make an electronic copy.	(154-1) Test comment from 4FRI.
Forlano, Debrianna Mansini	I hiked a remote area of the Jemez yesterday, where i have hiked for decades, and was ASTOUNDED a t the drought conditions. PLEASE protect our forests. They attract water which we are clearly desperate for in NM http://www.nytimes.com/2013/03/27/us/new-mexico-farmers-push-to-be-made-a-priority-in-drought.html?smid=fb-share&pagewanted=all&_r=0	(86-1) Thank you for your comment.
Free, Shastina	Today, there is a dangerous loss of oxygen in our atmosphere due to global warming issues and the GeoEngineering/Chemtrails (* See: Climate Researcher, Dane Wigington, on GeoEngineering/Chemtrails > YouTube) – which is constantly drying out our atmosphere as well. From these activities, the levels of Methane Gas in our atmosphere are extreme, and becoming dangerous for human beings. WE ALL need a certain amount of oxygen to live here. Trees provide a crucial source of oxygen for us all, which we cannot live without! Cutting down large numbers of trees in a time like this is not adding to our health but taking away a necessary source of oxygen!	(145-1) Thank you for your comments. The purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5). The DEIS provides a detailed evaluation of how the project would affect the forest's resiliency to climate change. Overall, alternative A would not prevent, delay, or decrease the predicted effects of climate change. Forest density would continue to increase, heightening the risk of stand density and insect and disease related mortality. The ponderosa pine forest would have limited resilience to survive and recover from potential large-scale impacts. Alternatives B and C affect fire behavior, forest structure, and forest health, and increase resilience to natural disturbances associated with climate change on over 500,000 acres in both the short and long term. Alternative D increases forest resiliency to large-scale impacts (including climate) in the short term. In the long term, however, over 300,000 acres would return to pretreatment conditions and would be susceptible to high-severity surface effects, which equates to reduced resiliency to natural disturbances. In alternative A, carbon stocks would remain high. In a current management scenario, large-scale fire events would release significant

		amounts of carbon into the atmosphere. In alternatives B, C, and D, individual tree growth would improve, resulting in larger average trees size and increased carbon storage over time, offsetting short-term losses of carbon removed through the mechanical thinning (DEIS, summary, p. xii). Please see the climate change section in chapter 3 of the DEIS for additional information.
Free, Shastina	Arizona is one of the driest states. The Ponderosa Pine is "is a very large pine tree of variable habit native to western North America" (from: Wikipedia Definition), so it is NOT A WEED!!! It adds a great deal to our forest. It is tall and gives shade and oxygen to all. Without these beautiful tall trees, our forest would not be nearly as beautiful or functional, as they keep our mountains in tact.	(145-2) Thank you for your comment. Please see page 8 of the DEIS for the purpose and need for restoration of the ponderosa pine ecosystem in northern Arizona.
Free, Shastina	As you know, the older trees are very important for many reasons. They offer a contribution to our Nature that is distinct from all other trees. They are also the habitat for the endangered species, Mexican Spotted Owl.	(145-3) Thank you for your comment.
Free, Shastina	This is an absolutely crucial time in our life on earth! PLEASE help keep our earth a place where human beings can live and thrive, rather than contributing to the demise of our home.	(145-4) Thank you for your comment.
Free, Shastina	Today, there is a dangerous loss of oxygen in our atmosphere due to global warming issues and the GeoEngineering/Chemtrails (* See: Climate Researcher, Dane Wigington, on GeoEngineering/Chemtrails) – which is constantly drying out our atmosphere as well. From these activities, the levels of Methane Gas in our atmosphere are extreme, and becoming dangerous for human beings. WE ALL need a certain amount of oxygen to live here. Trees provide a crucial source of oxygen for us all, which we cannot live without! Cutting down large numbers of trees in a time like this is not adding to our health but taking away a necessary source of oxygen!	(150-1) This letter is a duplicate of 145. See our responses to letter 145.
Free, Shastina	Arizona is one of the driest states. The Ponderosa Pine is "is a very large pine tree of variable habit native to western North America" (from: Wikipedia Definition), so it is NOT A WEED!!! It adds a great deal to our forest. It is tall and gives shade and oxygen to all. Without these beautiful tall trees, our forest would not be nearly as beautiful or functional, as they keep our mountains in tact.	(150-2) Thank you for your comment. The 4FRI restoration project team does not consider the ponderosa pine a "weed" and has never portrayed it as such. From page 8 of the DEIS, the stated purpose and need for this project is to re-establish and restore forest structure and pattern, forest health, and vegetation composition and diversity. After implementation of the project the entire ecosystem - including the ponderosa pine trees - would be healthier and more resilient to natural disturbances such as fire, insects and disease, and climate change.

Free, Shastina	As you know, the older trees are very important for many reasons. They offer a contribution to our Nature that is distinct from all other trees. They are also the habitat for the endangered species, Mexican Spotted Owl.	(150-3) Thank you for your comment. Much of the Mexican spotted owl habitat is at risk from high-severity wildfire. One of the objectives of the 4FRI restoration project is to reduce the risk of that happening and to improve the habitat for the prey of the Mexican spotted owl, in addition to other wildlife.
Free, Shastina	This is an absolutely crucial time in our life on earth! PLEASE help keep our earth a place where human beings can live and thrive, rather than contributing to the demise of our home.	(150-4) Thank you for your comment.
Gannon, Connie	I am urgently requesting that the US Forest Service reconsider the proposed million acre controlled burn in Arizona. The environmental and human health consequences of this project are unprecedented and the likelihood of some part of the burn going out of control is very strong, given the ongoing historic drought in the Southwest and strong heat-driven winds.	(116-1) Thank you for your comment. The purpose and need for this restoration project may be found on page 8 of the DEIS.
Gannon, Connie	The loss of habitat, loss of carbon storage and oxygen production, and loss of beautiful forests to refresh the spirit and purify the air spell disaster in terms of the Southwest's residents in terms of health and well-being, and the economic benefits that come from outdoor recreation. The real costs of this project also includes the lives of all the birds and animals who are killed and our children's ability to experience nature. Minor local job growth and economic benefit to corporate logging interests cannot compare.	(116-2) Thank you for your comments. Please refer to chapter 3 of the DEIS for the environmental consequences for air quality, socioeconomics, recreation and wildlife.
Gannon, Connie	Not only will the fires kill almost all the animals in their paths, they will drastically reduce habitat for any survivors. The Forest Service itself admits that it will be up to ten years before most of the million acres will again be habitable by brown bears, squirrels, and song birds. There is no purpose and no excuse for this wanton destruction.	(116-3) The DEIS does not state the post-treatment landscape would be inhabitable by wildlife for a period of 10 years.
Gannon, Connie	The Forest Service recently burned 7,250 acres in the Santa Fe Watershed and the San Juan Mountains, igniting the fires with 453 pounds of potassium permanganate, a neurotoxin. The Arizona project will burn 32 tons of potassium permanganate. Researchers Sandra Steingraber, Martha Herbert, Gabor Mate and others say potassium permanganate and the other poisons used in these projects, including herbicides, are implicated in ADD, autism and cancer.	(116-4) Thank you for your comment. Please see our responses to letter #6, #11 and #74.
Gannon, Connie	In addition, although the purported aim of the Forest Service is to thin the forests to reduce the risk of fire, scientists at Oregon State	(116-5) No specific literature was provided for review. See the climate change section of chapter 3 in the DEIS for the scope and scale of this

	University have concluded that the Forest Service's thinning and burning programs are adding massively to global warming.	project as it relates to climate.
Gannon, Connie	The Forest Service is required to collaborate with the public, but the only "collaborators" we see have money in the game--they are receiving grants or wood,–before the Forest Service burns the land, it invites commercial loggers in to harvest the trees–so these corporations are business partners, not citizen collaborators.	(116-6) Thank you for your comment. Please see chapter 1 of the DEIS for information and facts related to the collaborative nature of this project.
Gannon, Connie	There are many other alternative actions that would accomplish the stated purposes. We can have local wood harvesting co-ops like most countries do. We can educate homeowners to clear a defensible space around buildings, instead of clearing the entire forest. The Forest Service should preserve trees on steep slopes so all the dirt doesn't fall off. They should commit to zero use of carcinogens. They must obey the law about songbird protection, wilderness protection, and about correct public notification of plans, and meeting locations and times.	(116-7) Thank you for your comment. Please read the DEIS which addresses some of the topics raised (acres of treatment, BMPs to protect soils and steep slopes, migratory birds, wilderness and public involvement). Others comments related to educating homeowners (while valuable) are not relevant to this analysis and the decision to be made.
Gatewood, Steve	Greetings: Attached is a letter from Steve Gatewood, WildWood Consulting, LLC with comments on the 4FRI Draft EIS. The web-based comment submission process on the Forest Service web page was not working when I tried to submit these comments via that linkage. Please acknowledge receipt of these comments. Cheers, Steve ~~~~~~~~~~~~~~~~~~~~~~~~~~~~	(151-1) Thank you. We successfully received your comments.
Gatewood, Steve	Attached is a letter from Steve Gatewood, WildWood Consulting, LLC with comments on the 4FRI Draft EIS. The web-based comment submission process on the Forest Service web page was not working when I tried to submit these comments via that linkage.Please acknowledge receipt of these comments. Steve Gatewood and WildWood Consulting, LLC (WWC) have reviewed the Four Forest Restoration Initiative (4FRI) Draft Environmental Impact Statement (DEIS). We are also partners in the Greater Flagstaff Forests Partnership (GFFP) and have represented GFFP in the 4FRI Stakeholder Group DEIS review process.	(151-2) Your comments were successfully received.
Gatewood, Steve	This is an excellent EIS for landscape-scale forest restoration, but a few sections of the DEIS could use significant improvement as the project moves into the Final EIS phase, as identified below.	(151-3) Thank you for taking the time to comment on the project.
Gatewood, Steve	However, this DEIS provides a solid foundation from which to solicit comments and then move into development of a Final Environmental	(151-4) We believe we considered all reasonable recommendations and trust you will be able to see the updates in the FEIS.

Gatewood, Steve	Impact Statement (FEIS) and Record of Decision (RoD) based on what it hears from the public at large. The Greater Flagstaff Forests Partnership (GFFP) has reviewed the Four Forest Restoration Initiative (4FRI) Draft Environmental Impact Statement (DEIS). Overall, this is an excellent EIS for landscape-scale forest restoration on Coconino and Kaibab National Forest lands proposed for treatment within the first analysis area of 4FRI. At over 700 pages, the DEIS provides a thorough statement of the Purpose and Need for Action, adequate description of Alternatives to address that need, and a comprehensive discussion of the Affected Environment and Environmental Consequences of implementing each of the alternatives, including the Preferred Alternative C. The DEIS also includes several significant Appendices that address key aspects of the effects analysis like Forest Plan Amendments, Alternatives Implementation Plan, and Bridge Habitat. A few sections of the DEIS could use significant improvement as the project moves into the Final EIS phase, such as the Alternative B through D Monitoring and Adaptive Management Plan - Appendix E, and the Cumulative Effects - Appendix F and associated cumulative effects discussion sections in Chapter 3.	(169-1) Thank you for your continued assistance with this project.
Gatewood, Steve	It is gratifying to the GFFP to see many of the forest restoration, fuel reduction, habitat improvement and collaboratively developed treatment approaches which we have been using in our area (on both public and private land) applied throughout the DEIS. The same can be said of key issues found in the Affected Environment and Environmental Consequences, Chapter 3 – Noxious and Invasive Weeds, Tribal Relations, Socioeconomics, Scenery and Climate Change – that GFFP has been concerned about also. This DEIS provides a solid foundation from which to solicit comments and then to move into development of a Final Environmental Impact Statement (FEIS) and Record of Decision (RoD) based on what it hears from GFFP, other 4FRI Stakeholders, and the public at large.	(169-2) We reviewed all comments on the DEIS and considered all reasonable recommendations.
Gatewood, Steve	Here are several general comments from GFFP that address issues throughout the DEIS: 1. It should be made explicitly clear in the Final EIS that the focus of this project and environmental analysis is to address forested ecosystems dominated by ponderosa pine, and some other vegetation types embedded within that general	(169-3) Thank you for your recommendation. The summary section of the FEIS reads, "The Four-Forest Restoration Initiative (4FRI) is a planning effort designed to restore ponderosa pine forest resiliency and function across four national forests in Arizona including the Coconino, Kaibab, Apache-Sitgreaves, and Tonto National Forests".

landscape. For example, in the second paragraph of the Summary on page iii, the use of “ponderosa pine forest” should be moved from the last sentence to the first where the purpose of the project is initially introduced.

2. There should be more discussion and justification for how regeneration openings will be created through most treatment approaches proposed, and how they relate (or do not) to interspaces and other openings. The GFFP does not support the concept of creating independent regeneration openings in ponderosa pine forests to achieve forest restoration goals. We feel that appropriate regeneration has the potential to become established in all of the openings and from a management standpoint, it will be difficult to manage prescribed fire activity to protect those regeneration openings while using fire to maintain the interspaces as just grass, forbs, and shrubs. Combining desired “regeneration openings” with desired interspaces allows a better cross-walk to ecological system functionality - including the ability to mimic historic distributions of trees and a more ecologically supported regeneration process. A complete explanation of the concepts associated with regeneration openings as it relates to long term ecological restoration and forest management goals would increase understanding of and acceptance by external partners.

Gatewood, Steve

(169-4) Thank you for your comments. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a “read the land” approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the “red zone” density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the

Gatewood, Steve	3. Lack of an adequate and specific monitoring plan or adaptive management framework is a concern. A robust effects monitoring plan will be necessary to evaluate the response of the impacted resources from a landscape scale project – treating this many acres (500,000+) over 10 years has never been proposed or implemented before. Linkage to an adaptive management plan with thresholds	maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. (169-5) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan

and trigger points will also be required. We understand that the 4FRI Team is still working on a refined monitoring approach and specific details of an adaptive management plan.

. Lack of parameters/justification for establishing the size of tree groups, and not describing the full range (largest size group) allowed. There should be more detail on how the average size of tree groups was established at what appears to be the low end of what groups can/should be. The definition of "group" on page 345 says "many acres" – how big must some groups be, assuming most are <1 acre, to allow treatments to arrive at the "general" range indicated (0.1 to 1.0 acres).

Gatewood, Steve

(appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E.

(169-6) Thank you for your comments. Tree density is addressed in the DEIS (appendix D, implementation plan) on pages 610, 612, 614, 615, 618, 621, 623, 625, 628, 631, 633 and 636. For example, the language on page 610 states, "Manage for 150 square feet of BA where present or to attain 150 square feet of BA in areas with site potential capable of sustaining high tree density in alternative B and D. In alternative C, manage for a minimum of 110 square feet of BA where present or to attain 150 square feet of BA in areas with site potential capable of sustaining high tree density". Tree group size is addressed in the DEIS (appendix D, implementation plan) on pages 616, 619, 622, 624, 629, 632, and 634. For example, language on page 616 states, "Tree groups, on average, would range in size from 0.1 to 1 acre with northerly aspects and highly productive microsites having larger average group sizes. Overall, average group size would vary within this range depending on site quality, existing stand structure, and pre-settlement tree evidence"...Tree group density is addressed in the DEIS (appendix D, implementation plan) on pages 619, 624, 626, 629, 632, 634 and 636. For example, the language on page 619 states, "Tree group density would be managed to meet the canopy cover requirement of 40 plus percent within mid-aged forest (VSS4), mature forest (VSS5), and old forest (VSS6) tree groups and to assure that immature tree groups (VSS 2 and 3) are managed to maintain tree stocking necessary to provide for desired canopy cover as the groups mature to VSS 4, 5, and 6. By following the stocking guidelines and maintaining interlocking or nearly interlocking tree crowns, tree group density would meet and exceed the

Gatewood, Steve	There needs to be further discussion of Forest Plan Amendments as they relate to other projects (Flagstaff Watershed Protection Project - FWPP) that are using the same intent/justification and essentially the same language, i.e. – several of the more “controversial” amendments (MSO habitat and canopy cover/interspace) seem to be a requirement for other projects currently being planned/designed on the Kaibab & Coconino NF’s, and not an exception for each project.	canopy cover requirements. Stocking guidelines for tree groups for the WUI55, UEA40, UEA25, and UEA10 mechanical thin treatments are as described in table 119”. Openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, “Interspace would occupy approximately 25 to 40 percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet”. Table 118 on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. In the FEIS, additional analysis conclusions have been included for heterogeneity. For example, in the summary comparison of alternatives table (FEIS chapter 2), a heterogeneity category has been included. Metrics including percent openness or interspace (at landscape and habitat type sub-scale) and spatial arrangement have been used to describe the post-treatment condition. Also see the silviculture report and our previous response. (169-7) Thank you for your comments. We have copied the summary response regarding the significance of forest plan amendments from the FEIS: "In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52(DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from

the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the preferred

alternative is displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C): Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments

		have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS).
Gatewood, Steve	6. The GFFP is a member of the 4FRI Stakeholder Group and several Board members have been involved throughout the stakeholder process for review and comment on the DEIS. We support and agree with all comments submitted by the 4FRI Stakeholder Group regarding the DEIS. We look forward to working with you, the Forest Service 4FRI team, and other stakeholders on development and review of the Final Environmental Impact Statement and a proposed Record of Decision.	(169-8) Thank you for your continued assistance and support.
Gatewood, Steve	If you have any questions or need further clarification of these comments, please do nothesitate to get in touch with me at admin@gffp.org or at 928/600-3858.	(169-9) Thank you for your continued support and assistance.
Gatewood, Steve	There are three general comments from WWC that address issues throughout the DEIS that include: 1.It should be made explicitly clear early and often that the focus of this project and EIS is to address forested ecosystems dominated by ponderosa pine, and some other vegetation types embedded within that general landscape	(151-5) The purpose of the project is clearly displayed on page 9 of the DEIS.
Gatewood, Steve	2.Lack of parameters/justification for establishing the size of tree groups, and not describing the full range (largest size group) allowed; more detail on how the average size of tree groups was established at the low end of what groups can/should be; identifying how large tree groups can be (definition says “many acres”) that will allow treatments to arrive at the “general” range indicated (0.1 to 1.0 acres).	(151-6) Thank you for your comments. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a “read the land” approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group

size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes

.Lack of an adequate and specific monitoring plan or adaptive management framework is a concern. A robust effects monitoring plan will be necessary to evaluate the response of the impacted resources from a landscape scale project – treating this many acres over 10 years has never been proposed or implemented before. Linkage to an adaptive management with thresholds and trigger points plan will also be required.

Gatewood, Steve

Page 7: Two other regional efforts prior to the “Statewide Strategy to Restore Arizona’s Forests” should be included in 4FRI background discussion of the Final EIS – the Western Mogollon Plateau Adaptive Landscape Assessment and the White Mountains Adaptive Landscape Assessment. In addition, it would be helpful to identify that the effort to “identify alternative approaches to accelerating forest restoration” (4th paragraph under 4FRI Background) was initiated by the Southwest Region of the US Forest Service in order to emphasize their early involvement.

Gatewood, Steve

analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

(151-7) Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Appendix E of the FEIS includes goshawk monitoring. Appendix E includes the monitoring protocol for MSO that was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E.

(151-8) Thank you for your recommendation. The "Background" section of the FEIS now reads, "The 4FRI proposal is a result of several years of planning and collaboration among interested parties, groups and organizations, and Federal, State, and local government agencies. The focus has been to restore forest landscapes and reduce the potential for severe fire effects in a manner that benefits the local economy. In 2007, the Arizona Forest Health Council completed the Statewide Strategy to Restore Arizona’s Forests. The strategy’s vision integrates knowledge and experience from science, community collaboration, and economics to identify the necessary steps to increase the rate and effectiveness of forest restoration across Arizona. The communities that surround the

Gatewood, Steve	Page 16: Since the 4FRI project only addresses ponderosa pine forest, why is “Pinyon-juniper old growth allocation” discussion included here?	four national forests engaged in the 4FRI project are economically and social diverse. Apache, Coconino, Gila, Graham, Navajo, and Yavapai counties have economic bases in consumptive industries, agriculture, tourism and services to retirees. With this diversity has come an increasingly divergent vision of how to manage public lands and how to respond to the threat of uncharacteristic wildland fires. While the stakeholders may not always agree, there is strength in having stakeholders who can provide a wide range of potential solutions when working with the Forest Service. In February 2008, based on recommendations within the statewide strategy, the "Analysis of Small Diameter Wood Supply in Northern Arizona" report (Hampton et al. 2008) was completed. This process demonstrated a level of "social agreement" on how much, where, and under what basic parameters mechanical treatment, as one restoration tool, could be used to accelerate restoration of the 2.4 million-acre ecosystem. In 2008, the Kaibab NF launched the Kaibab Forest Health Focus, a science-based, collaborative effort to guide future landscape-level forest restoration efforts. To further advance collaborative efforts and secure the necessary assistance, the Forest Service created a task force to work with the Forest Health Council. The purpose of the task force was to identify alternative approaches to accelerating forest restoration in northern Arizona. To move into on-the-ground implementation as quickly as possible, stakeholders representing individuals, State and Federal agencies, local governments, the four national forests in northern Arizona, and the Forest Service’s Southwestern Regional Office moved forward with the four-forest initiative". In response to comments on the DEIS, we also included more discussion/language on the CFLR Act. (151-9) We are proposing prescribed fire treatments that affect the pinyon-juniper woodland cover type. The Coconino NF forest plan requires an old growth evaluation for ponderosa pine and pinyon juniper woodland.
Gatewood, Steve	Page 21: First paragraph under “Forest Resiliency, Fire Behavior” – there is discussion of “crown fire” and “high intensity surface fire” here, but Figure 14 on page 22 identifies only “Surface Fire” and then two types of crown fire – “Passive” and “Active”. This discussion should be expanded to address each condition and that the results	(151-10) Passive crown fire is mentioned on page 24. It is described, but more in passing than a clear definition. Since Figure 14 (reference in the text) does show both active and passive fire, additional clarification should be added. The Fire Ecology report describes all fire types in detail on page 16. Table 5 (page 37) in the Fire Ecology report has

	are from fire modeling efforts. It should also be pointed out how many acres of Passive Crown Fire there are if not included in the 200,000 acres identified as "crown fire potential".	numbers and percentages for surface, passive, and active crown fire. We will provide clarification in the FEIS in the discussion on modeled fire behavior under "Forest Resiliency, Fire Behavior" and clarify that crown fire potential includes passive crown fire.
Gatewood, Steve	Page 23: The Rio de Flag is identified as a water resource "at risk" on page 21, but the Rio is not mapped as a "resource at risk" in Figure 15. It should be mapped, perhaps with a note below the Figure about the Flagstaff Watershed Protection Project (FWPP) that addresses the Dry Lake Hills portion of that watershed.	(151-11) Thank you for your comment. We will refer readers to the soils report and water quality and riparian report. The soils resource report and chapter 3 of the DEIS and FEIS address the risks associated with watersheds in the project area.
Gatewood, Steve	Page 24: Second paragraph – should there be a discussion at some point about utilizing mechanical treatment techniques in strategic locations that do remove surface fuels? See also discussion in paragraph 4 about surface fuels up to 20 tons per acre.	(151-12) There is no mechanical treatments proposed with the objective of removing surface fuels. All comments that suggested the strategic placement of treatments was categorized as being outside the scope of the analysis and not in alignment with the purpose and need for the project. Treating only strategic locations is a strategy used for hazardous fuels treatments when the primary objective is to modify fire behavior and to reduce high severity fire effects. In ponderosa pine, there is an overlap between hazardous fuel treatments and restoration treatments because restoring ponderosa pine forests generally results in reducing the severity of potential fire effects. Fuel treatments can include such strategies as thinning from below or leaving a minimum distance between tree crowns or boles. Neither of these would put a ponderosa pine forest on a trajectory towards health and resilience. The treatments displayed in the DEIS (alternative C, preferred alternative) and FEIS are designed to put the landscape on a trajectory towards the desired condition by treating the entire landscape, not just 'strategically' placed treatments. Additionally, on a landscape the size of the 4FRI, it would be a gamble to guess where a fire might start, and the variables would be too numerous to make such an assessment valid.
Gatewood, Steve	Page 24: Fifth paragraph, first sentence – this sentence is the outcome and pathway of the overall project design. There should be some discussion here of those limited parts of the project area that used to and still may exhibit severe fire effects rather than "averaging" across large areas supporting diverse forest types and topographic settings. (see discussion below for page 25 - FRCC) Last sentence – is there a need to "reduce excessive surface fuel loadings in areas adjacent to and within" values at risk besides MSO habitat, like WUI's, streamside protection zones, recreation infrastructure,	(151-13) This discussion is, and is supposed to be, a fairly general discussion of the project area.

	nest sites, and other patches of “dense” forest?	
Gatewood, Steve	Page 25: Is the implication from paragraph 3 and Table 13 that 100% of the landscape will be treated to bring it into compliance with its respective historical fire regime, i.e. – FRCC 1? If so, great! However, if there are untreated areas (40% slopes, nest sites, etc.) or sites not treated sufficiently with mechanical and fire treatments to achieve this, even those small estimated percentages should be identified here.	(151-14) The DEIS and the Fire Ecology report (for each alternative) show desired conditions as the comment recommends, "The desired condition is to have 100 percent of the project area in FRCC 1. In FRCC 1, fire regimes would be within historical ranges and the risk of losing key ecosystem components would be low. Vegetation, fuels, and natural disturbances would be intact and functioning within historical ranges. There is a need to reduce the percent of the ponderosa pine and grassland vegetation in FRCC 2 and FRCC 3 and move the fire regimes toward FRCC 1" (DEIS, chapter 1, purpose and need, "Fire Regime and Condition Class" section). However, the wording will be changed to indicate the desired condition is to have no acres remaining in FRCC 3 after treatment. A true ponderosa pine FRCC 1 would need to be dominated by old trees and they are currently underrepresented in the project area.
Gatewood, Steve	Page 26: A more detailed discussion of those watershed features trying to be protected/restored might be helpful. See opening comment #2. “Watersheds would exhibit high geomorphic, hydrologic, and biotic integrity” is pretty vague.	(151-15) Thank you for the recommendation. In order to be as concise as possible, we will have to defer readers to the soils resources report that is included by reference in the DEIS (DEIS, p 105).
Gatewood, Steve	Page 27: It is unclear here whether there are “32 miles of ephemeral streams……” on the project area or on the entire Coconino National Forest (CNF). It should be clear for each statement whether forest-wide or for the project portion of the forest, even if that approach is identified earlier in the document	(151-16) Thank your for your comment, the statement refers to the portion of the project within the Coconino National Forest, not the entire Coconino National Forest. The FEIS (chapter 1) now reads, "On the Coconino NF, approximately 32 miles of ephemeral streams are heavily eroded with excessive bare ground, denuded vegetation, and head cuts. Of the total miles, approximately 6 miles are riparian streams and 26 miles are non-riparian. The Kaibab NF has approximately 7 miles (total) of degraded no riparian streams. Figure 19 shows an active headcut and lateral bank cutting that resulted in accelerated erosion rates. This condition is common in the project area".
Gatewood, Steve	Page 28: Fourth paragraph – as with streams above, it should be clarified whether there was a need to decommission 904 miles of road referred to under the TMR process within the project area portion of each forest or across both forests.	(151-17) The DEIS stated, "The Coconino and Kaibab NFs have identified the needed road system for public and administrative motorized use through the Travel Management Rule (TMR) process (see the transportation specialist report for details on forestwide transportation analyses). The TMR process identified a need to decommission approximately 770 miles of existing system and unauthorized roads on the Coconino NF. On the Kaibab NF, approximately 134 miles of unauthorized roads (often referred to as user-created routes) were

Gatewood, Steve	Page 37:It should be stated in the “Response” to “Issue 2: Conservation of Large Trees” that in “Appendix D, Section D – Modified Large Tree Implementation Plan” large tree retention is covered for Alternative C, the preferred alternative. See page 56 comments.	recommended for decommissioning" (DEIS, chapter 1, purpose and need, "Roads and Unauthorized Routes" section). The miles of road have been updated in the FEIS, “The Coconino and Kaibab NFs have identified the needed road system for public and administrative motorized use through the Travel Management Rule process (see the transportation specialist report for details on forestwide transportation analyses). The Travel Management Rule process identified a need to decommission approximately 726 miles of existing system and unauthorized roads on the Coconino NF. On the Kaibab NF, approximately 134 miles of unauthorized roads (often referred to as user-created routes) were recommended for decommissioning" (FEIS, chapter 1, purpose and need, "Roads and Unauthorized Routes" section). (151-18) The DEIS states, “All action alternatives (B, C, and D) are designed to meet canopy cover in VSS 4 to VSS 6 in compliance with the forest plans. The vegetation analysis addresses the interrelationship between canopy cover and old and large trees. To address post-treatment openness and canopy cover where the desired condition is to move toward an open ponderosa pine (savanna/grassland) reference condition, a nonsignificant forest plan amendment was developed for alternatives B, C, and D. The amendment describes how canopy cover will be measured and met at the group level, includes language that defines and describes interspaces, and describes the relationship between interspaces, openings, and VSS classes. It would also allow select acres to be managed for less than 40 percent canopy cover in VSS 4 to VSS 6 and less than 3 to 5 reserve trees per acre. The analysis discloses tree group stocking guides that would be used to meet tree group canopy cover requirements and evaluates the following within goshawk habitat: pre- and post-treatment distribution of habitat structure, overall habitat structure (VSS class), forest density metrics, and openness (DEIS, chapter 1, Issues, "Issue 3: Post-Treatment Canopy Cover and Landscape Openness" section). In response to comments on the DEIS, the language in Issue 3 was updated, " The vegetation analysis will evaluate how proposed treatments affect vegetation structural states, including those trees that are 16 inches d.b.h. or larger. This analysis will be used to inform the wildlife effects analysis. Alternatives B (proposed action alternative) and D do not incorporate the LTRS.

Gatewood, Steve	Page 38: First paragraph under Response – this is the second reference that the “vegetation analysis addresses” something. Please describe more specifically what the “vegetation analysis” is and where in the DEIS or Specialist Reports it is located. Also, there were no “indicators used to evaluate this issue” identified for Issue 3, like there were for all other issues.	However, alternative C responds to this issue by incorporating the key components of the LTRS and focusing on ecological desired conditions. It identifies ecological conditions where large, post-settlement trees may (or should) be removed to move toward or meet desired conditions. The intent of the LTRS has been incorporated into alternative C and E’s design criteria, the monitoring and adaptive management plan, and the project implementation plan (FEIS, chapter 1, Issues, "Issue 2: Conservation of Large Trees" section). The DEIS includes the following indicators for issue 2: Quantitative pre-treatment and post treatment three-level analysis for MSO, goshawk, old growth, and VSS for goshawk habitat at the landscape scale (ponderosa pine vegetation type) to gauge movement towards restoration desired conditions, and qualitative analysis of pre-treatment and post-treatment nonmarket social values that include large trees, public safety, and other biodiversity objectives that may conflict with the protection of large trees (DEIS, chapter 1, Issues, "Issue 2: Conservation of Large Trees" section).
Gatewood, Steve	Page 40:First paragraph under Proposed Action – indicates that the forests propose to conduct restoration activities “over approximately 10 years or until objectives are met”. Please explain if this is intended to allow treatments to extend beyond the 10 years, or if treatments can be stopped before the 10 years based on monitoring and adaptive management.	(151-20) Every year, the annual implementation checklist would be used to track compliance with the NEPA decision and ensure activities are constant and compliant with the analysis and decision. If the quantity of treatments in table 112 and table 113 by resource unit (appendix D) are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist’s reports, then the program of work is considered to be consistent with the effects analysis. If through monitoring it was determined a maintenance prescribed fire was needed, the implementation team would conduct a consistency review to determine if conditions had changed to such a degree that the environmental analysis and decision were outdated and needed supplementation. If the effects analysis was sufficient and still valid, the finding would be documented and the maintenance fire could proceed. Appendix E in the DEIS states, "Adaptive management refers to a "rigorous approach for learning through deliberately designing and applying management actions as experiments" (Murray and Marmorek 2003). Monitoring of alternative management actions provides the data for the adaptive management process. As a result of comparing monitoring results to the predicted outcomes, the plan provides a roadmap for adjusting actions or applying new science as long as the

anticipated effects are within the scope of impacts analyzed and disclosed in the EIS and record of decision (ROD). Some of the effectiveness monitoring objectives have adaptive management actions that would be taken if the established thresholds are reached or exceeded" (DEIS, pp. 661-662). Forest Service policy states, "If new information or changed circumstances relating to the environmental impacts of a proposed action come to the attention of the responsible official after a decision has been made and prior to completion of the approved program or project, the responsible official should review the information carefully to determine its importance. Consideration should be given to whether or not the new information or changed circumstances are within the scope and range of effects considered in the original analysis. If, after an interdisciplinary review and consideration of new information within the context of the overall program or project, the responsible official determines that a correction, supplement, or revision to an environmental document is not necessary, implementation should continue. Document the results of the interdisciplinary review in the appropriate program or project file. This documentation is sometimes called a supplemental information report (SIR) and should conclude with whether or not a correction, supplement, or revision is needed, and if not, the reasons why. A SIR is not a NEPA document and therefore cannot be used to fulfill the requirements for a revised or supplemental EA or EIS. A SIR cannot repair deficiencies in the original environmental analysis or documentation, nor can it change a decision. If the responsible official determines that a correction, supplement, or revision to an environmental document is necessary, follow the relevant direction in sections 18.2 - 18.4 (FSH 1909.15, Chapter 18.1).

Gatewood, Steve	Pages 48-51: There should probably be some discussion in the "Limit Mechanical Treatments to 8-inch d.b.h." alternative about why fire can't be used to push areas thinned to leave only >8" forest structure into a desirable condition – I.e., thin with fire. See also the first sentence at the top of: pages 52 and 53; and the last paragraph at the bottom of page 52.	(151-21) The comment that this responded to did not provide this, it was limited to mechanical thinning. It is not within the scope of comment analysis to add to comments. This is sufficient. :
Gatewood, Steve	Page 50: Aspen section – there are no acres listed like in other sections. Note 6 at bottom of page – wouldn't it be clearer to indicate that "density related mortality" of some trees "begins to	(151-22) The concept disclosed in this discussion is that aspen does not regenerate and grow well when it is overtopped by a conifer canopy. It is not an SDI discussion.

	occur" at 45-50% SDI and that "mortality" of some trees "is likely" at 60%+ SDI. High levels of mortality occurs at higher SDI numbers. The point is that some mortality is acceptable, especially in young trees, and high stocking has clearly not resulted in unacceptable mortality in many stands on-the-ground. It appears that silvicultural criteria are driving treatment design parameters more than evidence-based ecological restoration treatment design parameters. See also discussion of SDI, QMD and TPA numbers relative to the information included in Figure 74 on page 657.	
Gatewood, Steve	Pages 55-56: Grazing & Livestock bullets – it would be important here to also discuss the absolute need for the fine fuels that livestock would remove relative to the ability to perpetuate low intensity surface prescribed or natural fires across the landscape during fire treatments or events. In fact throughout the DEIS, potential impacts from grazing on fine fuel management should be emphasized and discussed more thoroughly.	(151-23) In response to comments on the DEIS, an additional mitigation measure (FE16) was added to ensure fire managers and range mangers coordinate grazing in advance of prescribed fire to ensure there is sufficient surface fuel to meet burn objectives. If grazing cannot cease long enough for sufficient fuel to build up to meet objectives, planned prescribed fires will be postponed until there can be sufficient fuel to meet objectives. (FEIS, appendix C, FE16). This is consistent with the revised Kaibab NF forest plan guideline that states, "Post-fire grazing should not be authorized until Forest Service range staff confirms range readiness" (FEIS Fire Ecology Report, p. 309).
Gatewood, Steve	Pages 56-58: Incorporate the Original LTRS – the second sentence of the first paragraph should be used earlier in the DEIS where this is discussed. This is an excellent discussion of LTRS limitations for achieving ecological restoration, however the discussion at the bottom of page 57 and top of 58 indicates that the exception categories "represented the majority of the landscape". Why is this an issue, especially if as stated on page 58 that "most acreage could be classified within the large young tree category"? This exception was made to allow large tree harvesting only where fire behavior modification couldn't be achieved without removing trees >16", which is the real reason the exceptions represented a majority of the landscape.	(151-24) The issue is the fact that the original LTRS was not incorporated into the preferred alternative as written. We have addressed the conservation of both old and large, young trees. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641 (web-based version of the DEIS). In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of

		goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Gatewood, Steve	Pages 58-59: Excellent discussion on 16-inch dbh cap alternative.	(151-25) Thank you for your comment.
Gatewood, Steve	Page 79: Alternative C – again, the statement "until objectives are met" is used. Explain	(151-26) Please see our previous response.
Gatewood, Steve	Page 80: Again, explain inclusion of pinyon-juniper woodland.	(151-27) Please see our previous response.
Gatewood, Steve	Page 125: Seventh paragraph – the terms "subtle expansion" and "extends greater flexibility" require additional explanation and possible quantification.	(151-28) This was intended to be a concise, qualitative discussion. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration.

		What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Gatewood, Steve	Page 131: Second & third paragraphs – an explanation of why there would be no representation of VSS 2 & 1 age classes post-treatment	(151-29) The DEIS Silviculture Specialist Report (pg. 86), states “As stand development progresses, the distribution shifts toward the later seral

	and at 2050 respectively.	stages by 2050". We can add the clarifying statement "without conditions that encourage establishment of new cohorts, VSS 1 and 2 will be underrepresented on the landscape".
Gatewood, Steve	Page 138: Again, discussion of pinyon-juniper vegetation.	(151-30) See our previous response.
Gatewood, Steve	Page 141: Last paragraph - What type of "biomass" will be removed? Do these numbers represent just commercial tree boles or do they include woody biomass (small diameter trees, tops, branches, needles, etc.)?	(151-31) Biomass refers to the total cubic volume. The "Methodology, Assumptions and Limitations" section on page 12 of the DEIS silviculture report states, "All cutting simulations assume 15% of the cut stems are left on site and 10% of the branchwood from the cut and removed stems are left on site. All other biomass resulting from the cutting is assumed to be removed. This statement appears in the FEIS silviculture report on page 25.
Gatewood, Steve	Page 145: Second paragraph – is the assertion here that "vegetation response" from treatments in the 9th & 10th years would have occurred? That does not seem possible, especially since no post-treatment prescribed fire events will have occurred. First bulleted paragraph – is the "removal of dead, damaged, or dwarf mistletoe infected trees to improve forest heal" the same as "Sanitation Salvage" in Table 53 on page 146.	(151-32) Table 53 lists the acres of activities from 2001 to 2010 that contributed to the existing condition as it was analyzed for this project. Table 54 lists present and foreseeable (i.e. will cause changes to the existing conditions).
Gatewood, Steve	Page 157: Last paragraph – There should be an explanation of why "from 2020 to 2050, no wildfires or additional treatments of any kind were modeled". This is critical to forest structure development and fire behavior trends, and information is provided in several other resource areas through 2050. In addition, the 4FRI Stakeholder Group asked for at least limited modeling with additional treatments through 2050.	(151-33) Pages 125 – 127 of the Fire Ecology report model Torching and Crowning that was produced in response to the stakeholders request. It included maintenance burning every 10 years because it is probably less speculative to assume there would be prescribed fire during that time period. Crowning and torching indices are rarely modeled spatially. It is possible, but there is no standard method, and would have taken weeks to get it done. We felt that the existing analysis included sufficient metrics, so this modeling exercise was not added to the DEIS, though a short analysis of the results of maintenance burning every 10 years was done in response to the Stakeholders request and is included in the Fire Ecology report. Modeling management actions past the propose actions would be highly speculative. There would be no way to know what actions future NEPA decisions would allow, or if and when wildfires, insects, disease, drought, and such would occur. Modeling management actions past the propose actions would be highly speculative. There would be no way to know what actions future NEPA decisions would allow, or if and when wildfires, insects, disease, drought, and such would occur.

Gatewood, Steve	Page 159: A table that summarizes RU fire behavior conditions would be helpful.	(151-34) The Fire Ecology report has such a table on page 243 (Table 117).
Gatewood, Steve	Page 343: There should be a definition of “Collaboration” in the Glossary as it is used in this DEIS.	(151-35) Thank you for the recommendation.
Gatewood, Steve	Page 347: There should be a definition of “Opening(s)” in the Glossary as used in this DEIS	(151-36) The glossary in the DEIS and FEIS includes a definition of openness as the percentage of the forested area that is grass/forb/shrub interspace.
Gatewood, Steve	Page 348: There should be a definition of “Patch” in the Glossary as used in this DEIS	(151-37) Thank you for your recommendation.
Gatewood, Steve	Page 349: There should be a definition of “Regeneration opening(s)” in the Glossary as it is used in this DEIS.	(151-38) The DEIS and FEIS including a definition of regenerate, “The act of renewing tree cover by establishing young trees naturally or artificially (SAF 2008)".
Gatewood, Steve	Page 352: There should be a definition of “Steep slopes” in the Glossary as it is used in this DEIS.	(151-39) In the DEIS, steep slopes are addressed (and associated with slopes greater than 40 percent) in the "Soil Erosion" section of chapter 3. Steep slopes (slopes greater than about 40 percent) are described in the "Soil Condition" section of chapter 3 of the FEIS.
Gatewood, Steve	Page 354: Uneven-aged forests – at the end of the definition, add “clumps or” before groups. “Intimately mixed” trees is an interesting term.	(151-40) To avoid confusion, the term “clumps” was not been used in this definition. While it may be appropriate to use in a general context, it would be too confusing to add it now.
Gatewood, Steve	Page 355: There should be a definition of “Within stand opening(s)” in the Glossary as it is used in this DEIS.	(151-41) The only reference to within-stand openings is found in the LTRS alternative considered but eliminated from detailed study section. The LTRS included the following definition, "Within Stand Openings are small openings (generally 0.05 to 1.0 acres) that were occupied by grasses and wildflowers before settlement (Pearson 1942, White 1985, Covington and Sackett 1992, Sanchez-Meador et al. 2009)". The FEIS (see FEIS, chapter 1, "Tree Density and Canopy Openness" section) focuses on openness and interspace (which are defined in the glossary).
Gatewood, Steve	NOTE: With all the opening definitions above and including interspace, there should be language in the definitions that creates distinguishing characteristics between them, especially related to desired future conditions or long term management objectives.	(151-42) See previous responses.
Gatewood, Steve	Pages 439-563: Regarding Forest Plan Amendments described in detail here in Appendix B, this is an excellent articulation and justification for these amendments, their effects, and the absolute need to accomplish true ecological forest restoration. However, here and throughout the document, there is some concern that these amendments are considered non-significant, are site specific, and do	(151-43) Thank you for your recommendations. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52(DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a

“not apply to any other forest project”. The intent, and in some cases the actual language, is very similar (in some cases exact) to plan amendments proposed in the Flagstaff Watershed Protection Project (FWPP) Proposed Action which apply to projects embedded within the Coconino National Forest part of the 4FRI first analysis area. We support the amendments, but the relationship of these amendments to other projects and apparent requirement that they be made to achieve a projects purpose and need/desired future conditions should be explained. The “non-significant” finding should also be expanded in that context if they may in fact be applicable to other projects within the forests.

procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project’s desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF’s plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The

purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C): Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time

		variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS).
Gatewood, Steve	Pages 439-563: Throughout Appendix B, when the amendment is for either the Coconino or Kaibab Forest plan, the other forest is often mentioned with that forest-specific plan amendment. It is confusing since there has been great effort to keep the amendments forest-specific.	(151-44) Hopefully the confusion will be reduced in the FEIS since the plan amendments only apply to the Coconino NF.
Gatewood, Steve	Page 458: In the definition of stands and interspaces (see also Glossary definitions and make them consistent), there should be some attempt to describe their relationship. For example, the proposed definition of stands currently states "… a contiguous area of trees …", which sounds like a group because no size parameters are given. Perhaps it should say a "… contiguous area of trees, tree groups and interspaces …" to denote that it is much larger (minimum 10+ acres) than current group sizes. Likewise, the interspace definition could be revised to say "… the open space between tree groups within a stand (and/or between stands??) intended to be managed …". This comment applies throughout Appendix B where these definitions appear.	(151-45) Thank you for your recommendation.
Gatewood, Steve	Page 497: Last paragraph – does the second sentence also remove the upper cap of 24" dbh for trees that cannot be removed? If so, we would recommend that this 24" cap be retained throughout the 4FRI project area even if the new/revised MSO Recovery Plan allows it.	(151-46) It is unclear how treating trees greater than 24 inch d.b.h. could be inferred from this paragraph. For clarification, no trees greater than 24 inch d.b.h. would be cut in MSO restricted and protected habitat (see DEIS, appendix C, W45). In the FEIS, this design feature is

	With continued controversy over “allowing” large and old tree removal, there should not be many situations where removal of trees of this diameter and above should be necessary to achieve the purpose and need, desired future conditions, or ecological restoration. Even if they are not old growth by definition, the removal of young, large trees of this diameter may not be justified.	W8 in appendix C.
Gatewood, Steve	520: Last paragraph – in this discussion it states that “(interspaces) are not equivalent to VSS 1”. While that is explicit, it does not say that portions of interspace cannot be designated as VSS 1 or as regeneration locations (but not regeneration openings), or that it can/would become that (regeneration/treed/forested) on its own over time even without the designation. This concept would be especially applicable on the northeast side of tree groups (away from prevailing winds during peak fire season) where allowing/designating regeneration will induce the long-term “shifting mosaic” of tree groups and interspaces that existed under historic fire regimes. If VSS 1 is always created within groups as seems to be directed throughout this DEIS (and which seems to force the tree group to be denser with regard to trees per acre, basal area and canopy cover/closure), then management intent seems to be to keep groups in a static location in perpetuity. Here and at other locations throughout the DEIS, there needs to be some discussion and justification as to why some areas of interspace should not be designated as regeneration “locations”, and that they should/can contribute to achieving 10% VSS 1 requirements. In reality, most interspace and other openings not on mollic soils or intergrades will support potential ponderosa pine regeneration, and unless the historical fire regime is implemented with prescribed fire for the first 30 years post-treatment and maintained over the long term, forest cover will ultimately dominate these “openings”.	(151-47) The desired conditions within goshawk habitat include a percentage of the landscape occupied by VSS 1 over time. Since this EIS analyzes a course of action to start moving toward the desired conditions, it would be premature to discuss management intent in perpetuity. The detailed silvicultural prescription for each treatment unit will document how much interspace and regeneration will be needed to move towards openness and age class distribution desired conditions and it will prescribe a comprehensive course of action to accomplish those objectives including placement guidance (See Table 139, DEIS Pg. 642). Table 144 (DEIS Pg. 666) lists ways in which regeneration and openness will be monitored.
Gatewood, Steve	Page 523: Upper right table block – here the term “created regeneration opening” is used. See discussion above for page 520.	(151-48) This terminology differentiates between existing groups of regeneration and those “created” to supplement the existing in order to move towards desired age class diversity.
Gatewood, Steve	Pages 565-599: Appendix C is an excellent consolidation of relevant information. However, several sections of Table 111 do not have the Purpose columns checked – FE9, FE13, T3 thru T8. There should be some discussion of the different columns under “Purpose” - “Forest	(151-49) This (lack of boxes being checked) has been corrected in the DEIS. If only the forest plan column is checked it implies it has been included because it is a forest plan requirement. If only the specialist recommendation column is checked it implies it was not a forest plan

	Plan Compliance" vs. "Specialist Recommendation". What is the implication of one or the other or both being checked?	requirement but perhaps a recommendation that the specialist developed or it has been included because it is a requirement from another law, regulation or policy. If both columns are checked it reflects a forest plan requirement that the specialist has also designed how the measure would be implemented.
Gatewood, Steve	Pages 573-574: Rangeland Management section – row R6 talks about "restrictions" on grazing after fire to assure "range readiness". We believe there needs to be discussion of deferred grazing in allotments in anticipation of scheduled prescribed fire to allow fine fuel buildup to assure "fire readiness". Adequate fine fuels will assure that surface fire objectives should be achieved throughout the burn unit.	(151-50) See our previous response.
Gatewood, Steve	Pages 574-575: Section RS1 - thinning approaches that "shape and/or feather" edges are discussed here to "avoid abrupt changes between treated and untreated areas" for aesthetic and scenery purposes. This feathering concept should be applicable in many of the treatment approaches that involve high degree of openness and/or surrounding dense forest structure. It will help group/stand density management and could help fire management and intensity as fires move through and between openings/interspaces and tree groups. There should be some discussion of it in the silviculture section and specialist report, and perhaps defined in the Glossary.	(151-51) The scenery report addresses the effects to scenery from this design feature. The silvicultural analysis assumes this to be a design feature that will be used during implementation.
Gatewood, Steve	Page 598: W45 row – we believe trees greater than 24" should not be cut anywhere on the forest except for safety and rare operational reasons, not just for MSO restricted and protected habitat, and that this should be a specialist recommendation too.	(151-52) We have addressed the conservation of both old and large, young trees. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641 (web-based version of the DEIS). Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain the desired tree cover range. The vegetation

Gatewood, Steve	Page 601: For Tables 112, 113 1nd 114 – there needs to be a row in each table addressing monitoring activity accomplished or proposed. "Monitoring Results" are identified at the bottom of Table 115, but	analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. (151-53) Thank you for your recommendation. Table 120 in the FEIS includes monitoring results. Monitoring results would be attached as supporting documentation.

	data collection is not in the other checklists as having been done nor to what extent - how many acres monitored in Table 113; has data been compiled and analyzed for adaptive management in Table 114.	
Gatewood, Steve	Page 610: Starting here & throughout Section A, discussion shifts between the old (1995) and new (2012) MSO recovery plan. References should be checked for accuracy & consistency – the first sentence does not identify which MSO recovery plan.	(151-54) Thank you for your recommendation. The FEIS clarifies the language in MSO habitat by Recovery Plan.
Gatewood, Steve	Page 611: Steep slopes are not defined – 40%, 50%, more? Add to Glossary?	(151-55) Please see our previous response.
Gatewood, Steve	Page 612: First paragraph & Table 116 – text says 10 sq ft of BA consists of gambel oak, but Table 116 indicates >20 BA for oak. Last paragraph – Alternative B & D allow up to 170 BA, but Alternative C caps it at 150 BA. Why can't stands in Alt. C go up to 170? Please explain the difference here even if it is included somewhere else.	(151-56) The first paragraph defines pine-oak, Table 116 lists the conditions that define target/threshold which is a sub-set of pine-oak.
Gatewood, Steve	Page 613: Sixth paragraph – this is an excellent description of treatments criteria to protect oak and utilizes direction from the resource to be protected. Similar discussion would be desirable in talking about group orientation, regeneration location placement, fuel structure and location, etc. See comment for page 520 above. We would like to see paragraphs 4, 5, 6 and 7 utilized through the treatment approaches for 4FRI to assure protection of key resource features and maximum habitat diversity.	(151-57) Section B of the Implementation Plan (Table 139, DEIS Pg. 642) is a decision matrix for establishing tree groups, interspace and regeneration openings to be used by the project silviculturist and implementation team. It includes guidance on placement of the different features. Please see Section A of the Implementation Plan (DEIS Pg. 610 – 641) for a complete list of design utilized through the treatment approaches for 4FRI to assure protection of key resource features and habitat diversity.
Gatewood, Steve	Page 614: Second paragraph – "patch" and the concept of "various patch size" is introduced here. Is a patch a group? Explain difference (or similarity) & what size range is desired. Also, "horizontal variation in stand structure" is used here – we would like to see that term used throughout the descriptions of desired stand conditions and for treatment approaches.	(151-58) This wording - "various patch size" and "horizontal variation in stand structure" comes directly from the MSO recovery plan and was adopted as guidelines in the Coconino NF forest plan. The purpose of including the management direction and desired conditions along with the treatment specific silvicultural design in the implementation plan was to give the project silviculturist and implementation team the needed information to develop the detailed silvicultural prescription for each treatment unit and prescribe a comprehensive course of action to accomplish those objectives.
Gatewood, Steve	Page 615: Last paragraph – great description of where & how to thin based on aspect/direction; could be used in other areas of silviculture discussion	(151-59) Thank you for your comments.
Gatewood, Steve	Page 616: Second paragraph – again, excellent description of objectives and OTIP; concepts/language should be used/reinforced earlier in descriptions of alternative treatment approaches – such as	(151-60) Please see our previous response on old and large trees.

	in Chapter 3? Page 616: Tree group discussion in paragraphs 5, 6 & 7 and other places throughout the DEIS – the statement in paragraph 5 that "Tree groups, on average, would range in size from 0.1 to 1.0 acre" opens the description of tree groups, but paragraph 5 concludes with "Overall, average tree group size would vary within this range depending on….". This is a very small and narrow average tree group range. It does allow for "larger average group sizes" on "northerly slopes and highly productive microsites", but gives no range of sizes, no "average" larger size that would be desirable, nor any maximum size allowable, like has been done with other forest structure parameters throughout the DEIS. The definition of Group on page 345 gives no average size but says the "size of tree groups is typically variable depending on forest community and site conditions and can range from fractions of an acre (a two-tree group) to many acres." We believe that: 1) the full range in size of groups anticipated should be stated – not just average; 2) an allowable maximum size should be identified at the top of that range – how many acres is "many" from the definition; and 3) a footnote should be used to indicate that Alternative C includes an AZGFD research project to evaluate variable group sizes (from 1-15 acres) from a wildlife perspective and through adaptive management the full range of group size desirable may be modified in the future as data becomes available. Our concern is that without these larger sized groups specifically identified and allowed/desired within the treated areas, very few larger groups will be included in the prescription because of the low average range; larger groups will only "remain" in untreated areas and not strategically located throughout the landscape; and if research indicates larger groups are beneficial for various reasons, there won't be many opportunities to "fix" what has already been done. We also believe that current AZGFD research and monitoring of Abert's squirrels on the USFS Mountainaire project and City of Flagstaff Airport project document the importance "winter core areas" to this species. These WICA's range from 4 to over 30 acres – (see attached report). Therefore, we would recommend that the average remain at	
Gatewood, Steve	0.1 to 1.0 acres, but that a range be indicated as from two trees to 4.0 acres with the stipulation that it will be reviewed regularly and	(151-61) Please see our previous response on tree groups and group sizes.

	may be adjusted up or down based on new information.	
Gatewood, Steve	Page 616: Paragraphs 6 & 7 are excellent descriptions of desirable tree group structure and were discussed at length during 4FRI field trips.	(151-62) Thank you for acknowledging the changes we made to the implementation plan based on discussions and feedback received during the field trips in September 2012.
Gatewood, Steve	Page 616: Paragraph 10, regeneration openings – here and at other places in the DEIS the discussion of regeneration openings can be confusing. It states they "account for 10-20 percent of tree groups" and then later says they "would be created adjacent to tree groups and would not be surrounded by interspace". What is "surrounded" – greater than 50% or the entire perimeter? Is this "opening" adjacent to interspace part of the group itself? As stated earlier (comment on page 520), we support regeneration adjacent to smaller groups rather than within. It should be explicitly stated here and at other locations that regeneration openings will not be created by removing old growth trees even if they are the "most abundant tree size classes".	(151-63) Please see our previous response on regeneration openings and openness. The intention of the design is to not place regeneration openings adjacent to created interspace.
Gatewood, Steve	Page 617: Eighth paragraph – some discussion of the ground cover/herbaceous layer should be included in "Vegetation Management Direction" like it was in "Desire Conditions" below. Similar comment/concern for all these descriptions throughout Section A.	(151-64) Thank you for your comment. The desired condition in goshawk habitat "Interspace has a robust herbaceous layer" ties back to the statement in the previous paragraph (Vegetation Management Direction) about providing habitat for goshawk prey. The MSO direction relates back to "key habitat components".
Gatewood, Steve	Page 618: First paragraph – are the statements "canopy cover is measured with vertical crown projection on average across the landscape" and "canopy cover guidelines apply only to mid-aged and old forest structural stages" in conflict? Fourth paragraph – are these densities, BA's and SDI's proposed to be achieved with "inclusion" of interspaces as stated? Table 118 – should this table include regeneration openings too, or are they considered part of groups but open?	(151-65) In the first paragraph the staements are not in conflict. In the fourth paragraph, the densities, BAs and SDIs are proposed to be achieved with the inclusion of interspaces. See Table 140 (DEIS Pg. 654) for more detail on the relationship between treatment intensity, tree group density and overall average density. In able 118 regeneration openings are considered tree groups (VSS 1); regeneration openings are not interspace. Also see our previous responses.
Gatewood, Steve	Page 619: Second paragraph – again here it appears that "average group size would vary within this range", the average range of 0.1 to 1.0. How will larger groups be allowed and/or encouraged with this statement? Table 119 – there is a wide range of tree density/TPA in this table; perhaps there should be a note regarding using evidences to determine where within this range it should fall and then account for small tree that would not leave evidences by site class. The final paragraph on the page begins to address this, but only for VSS 4, 5 &	(151-66) Please see our previous responses. In table 119 the ranges cover the possibilities within each of the diameter classes. See Figure 74 (DEIS Pg. 657) for more detail on density management and stocking guidelines by individual one inch diameter class.

Gatewood, Steve	6. Last paragraph – this is an excellent way of keeping actual treatments from always resulting in densities at one end of the range of the other. This concept – percent allocations among a range of numbers/conditions - should be introduced earlier in treatment approach descriptions (Chapter 3?) and used for other structural attributes to achieve heterogeneity and structural diversity. Are the "10 percent remain unthinned" deferrals? Page 620: Are residual and reserve trees the same, and are reserve trees in openings always ponderosa pine? Table 120 - Interspace widths of 25-40 feet are not very wide; they are more like canopy gaps than interspaces. Perhaps these widths can be located only where trees have a low canopy?	(151-67) This is wording directly from the Coconino NF Forest Plan. The trees are above and beyond the trees of woodland species that we state we are not cutting, so yes, they would be ponderosa pine
Gatewood, Steve	Page 621: First paragraph – prescribed fire will also kill regeneration (which is necessary in interspaces and within stand openings), so this should be discussed along with "stimulate regeneration".	(151-68) The term "regeneration" in this paragraph refers to herbaceous vegetation, not tree seedlings.
Gatewood, Steve	Pages 622-625: Throughout this section, discussion needs to occur regarding how to keep treatments from consistently falling at the low end of everything – TPA, BA, interspace width, tree group size, etc. Perhaps the % discussion would be appropriate, i.e. – 50% at narrow interspace width, 30% at mid, 20% at wide.	(151-69) Table 140 (DEIS Pg. 654) emphasizes that interspace, regeneration openings, tree group density and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (pg. 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size) and the amount of regeneration openings may be made during implementation to ensure tree group density remains outside of the "red zone" density. Note: the design for the treatments discussed on pages 622-625 does not include regeneration openings.
Gatewood, Steve	Page 625: The first sentence under LOPFA Pine Sage should be used throughout many of the treatment descriptions and desired conditions statements. It is the crux of the overall desire for forest restoration but then "adjusted" due to existing vegetation conditions, other resource objectives, and physical constraints.	(151-70) Similar language is used in the design for the Savanna/Grassland Restoration treatment types as well as the decision matrix for placement of tree groups, interspace and regeneration openings (DEIS Table 139).
Gatewood, Steve	Pages 625-627: Need more through discussion within these two sections (Pine Sage & Savanna/Grassland) regarding maintaining and enhancing an herbaceous and/or shrubby ground cover. These descriptions sound just like managing the rest of the forest. Fuels, forest structure – if any, CWD, interspace, etc. will be very different,	(151-71) The principal strategy throughout the different treatment types is an emphasis on restoration of forest structure and creating conditions as appropriate that will result in a robust herbaceous understory. Specific situations that will encourage herbaceous understory response is a reduction of the overstory tree canopy

	especially for savanna/grassland. Perhaps the concept of interspaces shouldn't even be used here – it is actually trees/groups between predominantly herbaceous vegetation. Also, achieving 5-7 tons of the required types of CWD in a grassland or savanna will be difficult.	through mechanical means, and by increasing residual tree canopy base height, reducing litter/duff cover and producing effects that stimulate regeneration and growth of native herbaceous vegetation through the use of prescribed fire. The main focus for the Pine-Sage treatment types enhancing conditions for understory grass/forb/shrub development where the trees have encroached on historic openings.
Gatewood, Steve	Page 628: First paragraph – use of fire should be changed to "will" not "may" be used; insert "and maintain savanna/grassland desired future conditions" between "fuel hazards" and "where".	(151-72) Until a decision is made, the proposals continue to use terms such as "would" and "may".
Gatewood, Steve	Page 636: dPFA/PFA Pine Sage – need more discussion of understory/groundcover DFC's and its role in fire to maintain this vegetation type.	(151-73) Please see our previous responses. (151-74) Although this area is classified as a PJ cover type, it has a variable ponderosa pine overstory (including pre-settlement trees) and much of the area is considered transitional between the PP and PJ cover type. As illustrated in the design for the PJ WUI treatment type there is heavy emphasis on the sustainability of the old ponderosa pine component. Also see our previous responses.
Gatewood, Steve	Page 638: Pinyon –juniper section – similar comment to earlier discussion of PJ.	
Gatewood, Steve	Page 640: Next to last paragraph – this would be a good intro paragraph for all Savanna/grassland (and possible Pine Sage) vegetation types because it emphasizes ground cover and not forest type. Could insert "herbaceous groundcover and" just before "meadow edge" for clarity and additional emphasis.	(151-75) This treatment type is specific to areas currently classified as grassland cover type whereas the Savanna/Grassland Restoration treatment types are specific to areas currently classified as ponderosa pine cover type and are on mollic and mollic integrade soils (see silviculture specialist report). Therefore, the treatment types have different emphasis and objectives.
Gatewood, Steve	Page 644: First paragraph - add "such as regeneration openings" at the end of the last sentence.	(151-76) Thank you for your recommendation.
Gatewood, Steve	Page 646: Second paragraph – Please remove "post-settlement" from the first sentence. This section is large trees and old, post-settlement trees have been addressed in the LTIP. Third paragraph – second sentence referring to "strategy" should be "plan" as used elsewhere in the DEIS.	(151-77) Thank you for your comment. We believe the word post-settlement adds clarity.
Gatewood, Steve	Page 648: reference to "seep or spring" and "riparian" in the Desired Conditions section should refer to "wet meadows".	(151-78) Thank you for your comment. The terms are correct. Wet meadows are part of riparian systems.
Gatewood, Steve	Page 649: Third paragraph – reference to "reductions in livestock grazing pressure" should be deleted or that issue should be addressed in several other places throughout the DEIS where it should be incorporated. Desired Conditions section – change "seep	(151-79) This language is from the original large tree retention strategy. Although we modified the strategy and created desired conditions, it was not our objective to rewrite the entire strategy. For this reason, no changes will be made.

	or spring" to "grassland".	
Gatewood, Steve	Page 653: Second bullet – what are "such trees"? Third bullet – use the term "canopy gap", these should be described, defined. Fourth bullet – need to be consistent in opening size; intro paragraph has 0.05 to 1.0.	(151-80) Thank you for your recommendation. Regarding the fourth bullet, this is specific to regeneration openings (not interspace) and is consistent with the design in the implementation plan.
Gatewood, Steve	Pages 654-657: Section E – there should be an introductory discussion to Table 140 and Figure 74. This is an important section and the use of this info is not clear. Also, what does the note "Tree groups will not be managed within this zone" mean? Clarify.	(151-81) We agree. Please refer to DEIS Pg. 602 for a brief introduction to Section E of the Implementation Plan. See the silviculture specialist report (pg. 28 – 30) for a discussion on density. Also see Table 7 for a comparison of how zones 1 – 4 compare with the green, yellow, orange and red zones in Figure 74. The red zone is considered unsustainable, and thinning strategies will focus on managing tree density within the green, yellow or orange zones and not within the red zone.
Gatewood, Steve	Pages 659-674: WildWood Consulting would like to work with the FS to refine the monitoring section and complete the adaptive management sections. As has been stated, they were placed here in incomplete form to finalize for the FEIS.	(151-82) Thank you for offering your assistance. See our previous response on the monitoring and adaptive management plan (changes from DEIS to FEIS).
Gatewood, Steve	Pages 675-697: Cumulative Effects – this section does a good job of identifying previous, current and foreseeable actions. However, it should be linked to discussions of cumulative effects in Chapter 3 and a summary display table by Alternatives that includes the Chapter 3 effects analysis should be provided. On page 697, the FWPP should be added as a current project since the Proposed Action is out for review and there may be a Draft EIS by the time the Final EIS for the 4FRI first analysis area comes out.	(151-82) Thank you for your recommendation. We clarified the intent of appendix F in the FEIS. It is not possible to recreate everything that is in appendix F in chapter 3. Readers should go to the specialist report for that level of detail. The FWPP has been added as reasonably foreseeable action (in the FEIS).
Gatewood, Steve	Page 699: The Bridge Habitat section provides an important discussion and is well done.	(151-84) Thank you for your comment. Some updates did occur to this analysis between DEIS and FEIS.
Gatewood, Steve	Page 10: There are no Restoration Unit numbers in the map below Table 3 that correspond with the RU #'s in the table.	(151-85) Thank you for your comment. Adding in restoration unit numbers in addition to the variety of colors would have made viewing difficult. Unfortunately, readers will have to also refer back to the maps with restoration units identified.
Gatewood, Steve	Page 16: Table 9 is labeled "pinyon-juniper old growth allocation….", but the heading row within the table says "Ponderosa Pine….".	(151-86) Thank you for your comment. This has been corrected for the FEIS.
Gatewood, Steve	Page 18: Last sentence on page - Please explain what "catching sites" are.	(151-87) Thank you for your comment. The term should have been correct to cache site. This was overlooked.
Gatewood, Steve	Page 160: Table 59 – Should there be years in the right hand block?	(151-88) Thank you for your comment. This has been corrected in the FEIS.

Gatewood, Steve	Page 638: Is there another part of the heading for Table 138 in the upper right columns?	(151-89) The table headers are displayed correctly.
Gatewood, Steve	Thank you for the opportunity to comment on this important project document and WWC looks forward to working with you, the 4FRI team, and other stakeholders on development and review of the Final Environmental Impact Statement and a proposed Record of Decision.	(151-90) Thank you for working with us throughout the process.
Gavin, Wili	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this	Thank you for your comment. Please see our response to Letter #19.

Gibson, Craig	document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other	(192-1) Thank you for your comment and interest in the 4FRI. Please see the response to letter #19.

	conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Gold, K E	I strongly protest the plan to burn 1 million acres, destroying habitat for bears, squirrels, and birds and contributing to global warming. These fires will contribute to already severe asthma and breathing problems. The fires will worsen climate change, which is what is already causing the drought that is causing the fires! There are other options that ate far less perilous to the health if human beings and other species. This is a terrible idea	(83-1) Thank you for your comment. Please see the purpose and need (DEIS p 8) for restoring the fire-adapted ponderosa pine ecosystem.
Goode, Cutter	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest	(127-1) Thank you for your comments. Please see our response to letter #19.

	canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Graham, Patrick	Accelerating the rate of restoration will require rethinking priorities, adopting new practices, and improving efficiency. New technology is available that could streamline, reduce costs, and create innovative, timely ways to conduct and monitor forest thinning. The Nature Conservancy is committed to continuing our work with the Forest Service, private sector, and stakeholders to create a more effective program for shared learning and adaptive management.	
Grossman, Ellen	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting	(110-1) Thank you for your comments. Please see our response to letter #19.

	wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Gunst, Susan	To Whom it may concer; In response to the enclosed editorial: Whereas the inhabitants of the earth are under communism, i.e. simply: lack of freedon; and the general populace has had their minds brainwashed of thought and action - - all the many intricasies	(214-1) Thank you for your comment.

	of Burning for gain boils down to one thing only - INSANITY. Susan Gunst I am one person who has most of her berain intact to dscern good from evil & right from wrong.	
Hanson, Chad	On behalf of the John Muir Project of Earth Island Institute (JMP), I am submitting these comments on the Draft Environmental Impact Statement (DEIS) for the proposed "Four-Forest Restoration Initiative" on the Coconino and Kaibab National Forests Project (4FRI project). I have a Ph.D. in Ecology from the University of California at Davis, with a research focus in forest and fire ecology. I offer the following comments:	(148-1) Thank you for taking the time to comment on the project.
Hanson, Chad	On behalf of the John Muir Project of Earth Island Institute (JMP), I am submitting these comments on the Draft Environmental Impact Statement (DEIS) for the proposed "Four-Forest Restoration Initiative" on the Coconino and Kaibab National Forests Project (4FRI project).	(149-4) This letter is a duplicate of letter 143. Please see all responses in 143.
Hanson, Chad	The DEIS Fails to Consider Well-known Recent Science on Historic Forest Density and High-severity Fire Extent The Silviculture Report, relied upon by the DEIS, states, under the heading of "Desired Conditions" (in the project area), that the historic (pre-fire suppression) forests in the project area were very open and had only about 2 to 40 trees per acre, with a general average of about 23 trees per acre (Silviculture Report, pp. 54-55), relying upon spatially-limited studies using small areas and small plots. However, the DEIS fails to mention, let alone analyze, the only landscape-level studies ever conducted in northern Arizona—studies that use actual historical plot data across vast areas. Specifically, I refer to Williams and Baker (2012) and Williams and Baker (2013), both of which used extensive U.S. General Land Office field data from the 19th century to assess historic forest structure and fire patterns. Williams and Baker (2012) was conducted in the Kaibab and Coconino National Forests around Williams and Flagstaff (and southeast of Flagstaff)—in the largest portion of the 4FRI project area. They found that the historic forests were dominated by areas with 89-134, 134-178, and >178 trees per hectare over 10 centimeters in diameter at breast height (36-54, 54-72, and >72 trees per acre) (Williams and Baker 2012, Figure 2). Over 25% of the forest had more than 178 trees per hectare (more than 72 per acre). In Williams and Baker (2013),	(148-2) Thank you for your comments. However the comment incorrectly quotes the silvicultural specialist report. The silvicultural report states on page 55 that " [r]estoration studies on the Fort Valley Experimental Forest near Flagstaff, Arizona, showed an average of 23 trees per acre that were grouped into distinct 0.05- to 0.7acre groups consisting of 2-40trees (Covington et al. 1997)". This statement was an example of how structural characteristics are widely reported for southwestern ponderosa pine. "[T]he desired condition is to reestablish non-forested openings that have been invaded by ponderosa pine since fire exclusion and reconfigure the forests toward their natural spatial pattern. At the fine scale, groups of trees would typically range from 0.1 acre to 1.0 acre in size" (DEIS page 11). The DEIS desired conditions that relied on the Silviculture report considered well-known recent science (White 1985, Fulé et al. 2003 and Covington et al. 1997) on historic forest density. The DEIS, supported by the Silviculture Report, utilizes multiple studies throughout the southwest (Silviculture specialist report, Page 54-55) to support the: distribution of species composition, tree density and distribution, historic range of variability, forest openings, sustainability and resilience. The bulk of the science relating to fire regimes in southwestern ponderosa pine does not agree with Williams and Baker (2012, 2013). However, Williams and Baker's (W&B) forest structure (stand density, species composition)

conducted around Tusayan—in the smaller, northernmost portion of the 4FRI project area—they found that historic forests were dominated by areas with 100-150, 150-200, and 200-391 trees per hectare over 10 centimeters in diameter at breast height (40-61, 61-81, and 81-158 trees per acre). The DEIS violates NEPA by failing to fully and completely consider these findings or incorporate the findings into the proposed action. Moreover, the DEIS fails to clearly divulge what the post-logging trees per acre would be in most of the areas proposed for logging in the project area.

Hanson, Chad

Further, the DEIS (p. 158, Table 58) states that the Proposed Action and Preferred Alternative would result in only 1-2% active crown fire (high-severity fire), and only 3% passive crown fire (mixed-severity fire). Williams and Baker (2012) found that the historic forests had 15% high-severity fire effects and 23% mixed-severity fire effects (Williams and Baker 2012, Table 2), indicating that the action alternatives would not restore historic fire regimes but, rather, would take forests outside of the natural, historic range of variability, compromising ecological resilience. This information, though well known to the Forest Service, is simply not addressed in the DEIS, in violation of NEPA.

Hanson, Chad

The DEIS Misrepresents, and Misleadingly Presents, the Data in Stand Density Index (SDI) The DEIS (p. 14, 18) claims that, above 60% of maximum "Stand Density Index" (SDI), forest stands are at high risk of beetle mortality, and that the intensive logging proposed in the Proposed Action and the Preferred Alternative—which would

reconstruction is not substantially different from many previous studies ((Fule et al. (in press)). The analysis used multiple well known and creditable studies, related to the project area, to provide site specificity for variable conditions. The FEIS has added additional discussion of the Williams and Baker papers in Chapter 3 of the document. The desired condition of the FEIS in Chapter 1 discloses that the number of trees per group varied from 2 to 72 with groups range in size from .1 to .75 acres as well.

(148-3) As noted in response 148-2, the DEIS, supported by the Silviculture Report, utilizes multiple studies throughout the southwest (Silviculture specialist report, Page 54-55) to support the: distribution of species composition, tree density and distribution, historic range of variability, forest openings, sustainability and resilience. The bulk of the science relating to fire regimes in southwestern ponderosa pine does not agree with Williams and Baker (2012, 2013). However, Williams and Baker's (W&B) forest structure (stand density, species composition) reconstruction is not substantially different from many previous studies ((Fule et al. (in press)).Fulé et al. (in press), refute the conclusions of Williams and Baker, and describe in detail how the preponderance of scientific evidence indicates that conservation of dry forest ecosystems in the West and their ecological, social, and economic values is not consistent with a contemporary disturbance regime of large, high severity fires, especially under changing climate. Fulé et al. in press) has 18 co-authors, the majority of whom are well published in peer-reviewed journals. This analysis used multiple well known and creditable studies, related to the project area, to provide site specificity for variable conditions. The opposing science that is brought up here is sufficiently offset by existing and new science supporting the proposed actions. The FEIS includes discussion and the relevance of the Williams and Baker articles in Chapter 3 of the FEIS, as well as in the fire ecology specialist report.

(148-4) The DEIS does not claim on page 14 or 18 that, above 60% of maximum "Stand Density index" (SDI), forest stands are at high risk of beetle mortality. The DEIS states on page 14 that, "Based upon established forest density/vigor relationships, density related mortality begins to occur once the forest reaches 45 to 50 percent of maximum

directly kill and remove, through logging, most of the existing trees—is somehow necessary to prevent and reduce tree mortality. However, the DEIS fails to divulge the fact that the cited studies, and other relevant studies on SDI, show that the levels of tree mortality that result in stands above 60% of SDI are, on average, far lower than the guaranteed, direct levels of mortality that would be caused by logging. Oliver (1995) found that, as relatively young ponderosa pine stands reached SDI levels from 300 to 365, beetle mortality reduced stand density by only about 13-20%. Mortality was near zero when SDI values were below 230 (Fig. 2 of Oliver 1995). Further, despite modest mortality as stands neared SDI of 365, the stands ultimately continued to grow more mature and more dense, reaching an SDI of 571 (100% of maximum SDI) finally (Fig. 1 A-C of Oliver 1995). Oliver (2005) found that the very densest pine plots increased to a basal area of 175 square feet per acre, and an SDI of around 350, and then experienced beetle mortality of only 17% of the basal area (down to about 145 square feet per acre). In the ponderosa pine plots, the densest plots increased to a basal area of about 220 with almost no beetle mortality after the stands reached about 85 years of age (Oliver 2005, Fig. 1). Oliver (2005) noted that mortality levels have "declined over the years" in the dry ponderosa pine forests as these forests have grown older and denser. Further, the Cochran and Barrett (1995) study investigated pine stands and found that, even at higher SDI levels, "there was no apparent correlation between stand density and mortality" (see p. 9 of Cochran and Barrett 1995). In that study, the highest annual growth rates were at SDI values over 200 (Figs. 14, and 18-20 of Cochran and Barrett 1995). The maximum basal area mortality of any plot (i.e., not the average) was only 29% over 30 years (about 10% in a given decade—much less than decadal growth), and most plots had far, far less mortality than this. The "high" mortality rates in Cochran and Barrett (1995) were only about 5-10% of the basal area and less than 5% of the SDI for the very densest plots (Figs. 1 and 2 of Cochran and Barrett 1995). Similarly, Cochran and Barrett (1999) found essentially the same thing as Oliver (2005), discussed above. The study found that, once ponderosa pine stands became older than 85 years of age, mortality from beetles dropped to nearly zero even at SDI values of 250-300 (see Fig. 3 and stand density, and mortality is likely at density levels over 60 percent of maximum stand density (Long 1985)". This statement is directly related to density-related mortality and not bark beetle hazard. The reduction of bark beetle hazard promotes forest sustainability and health. Reducing bark beetle hazard is conducted by reducing the stress and competition between individual trees, resulting in a reduction in stand density. The bark beetle hazard model for southwestern ponderosa pine on DEIS page 18 is exclusively based on the tree density relationships developed in the Dendroctonus hazard model by Munson and Anhold 1995 (as documented in Chojnacky et al. 2000) and the draft Ips hazard model developed by McMillin et al. (2011)(Silviculture Specialist Report, Page 51) . Bark Beetle Hazard or 'susceptibility' is the inherent characteristic of a stand of trees that affect its likelihood of attack and damage by bark beetles (McMillin et al. 2011). Cutting of trees will directly reduce the population but will reduce the hazard and risk of bark beetle outbreaks while maintaining a healthy forest. The use of 60% of max SDI by Munson and Anhold 1995 (as documented in Chojnacky et al. 2000) and the draft Ipshazard model developed by McMillin et al. (2011) is appropriate to display bark beetle hazard (aka the likelihood of attack and damage by bark beetles). Chojnacky et al. 2000 indicate that increasing beetle attack is correlated with increasing SDI…Other unknown factors independent of stand density may initially draw bark beetles to a stand, but once in a stand the beetles seek out the pockets of higher SDI. "The methods are trustworthy in predicting that once beetles enter a stand, the more dense stands with larger stand density index (SDl) can be expected to have greater beetle attack" (Chojnacky et al. 2000, pg. 10).The comment misinterpreted and misused Oliver 1995 by taking data that was appropriately used to demonstrate stand density of good sites to poor sites and developing conclusions. In addition, ponderosa pine SDI maximums used in FVS modeling were 500 (Region 5) and 429(Region 6) for Oliver 1995. National standard for ponderosa Pine SDI max is 450. The comment's claim of SDI reaching 571. It is unknown where or how this conclusion was derived.Oliver 1995 found that "Bark beetle kills created a limiting Stand Density Index of 365 which differed little between stands on poor sites east and good sites west of the crest of the Sierra Nevada and Cascade Range. Although good sites would be

Table 3 of Cochran and Barrett 1999). Even when the stands in this study area were younger, as they were when studied by Larsson et al. (1983), the mortality levels from beetles were still relatively modest for stands with basal areas over 150 square feet per acre (i.e., a minority of the total stand basal area).

expected to carry a greater stand density than would poor sites, more explosive bark beetle populations and density-related stem breakage cancel this site advantage" (Oliver 1995, pg. 213). This Oliver paper demonstrates how SDI is limited to 365 for ponderosa pine when bark beetles are present in the ecosystem. Stands that approach SDI 365 usually suffer large losses from bark beetle epidemics-losses that equal or exceed periodic growth. Figure 2 suggests that beetle kills from endemic populations can begin when stands reach SDI 230 (Oliver 1995).This analysis utilized relevant studies on SDI related to bark beetle hazard. We found that the comment misinterpreted and misused Oliver 2005 due to not understanding the study and the history. The initial study design for "Stand densities to be retained after thinning was specified as a series of growing stock levels (GSLs) (Myers 1967). These levels were defined by relationships between basal area and average stand diameter. Numerical designation of the level assigned to a plot was the basal area per acre that would remain after thinning when mean stand diameter was 10 inches or more" (Oliver 2005, Pg. 72). "During the planned 20-year life of the study, the six installations were established and maintained in general conformance with the plan except as follows: (1) two rethinnings were performed at Elliot Ranch at five-year intervals rather than ten-year intervals because of rapid growth (fig.1); … (4) the controlling measure of stand density was changed to stand density index (SDI; Reineke 1933) (Oliver 2005, Pg. 73-74).The comment displays assumptions that are false. The 17% reduction of basal area was due to the thinning to the appropriate GSL and not from beetle mortality. The increase of BA through time was due to managing the GSL to a specified SDI. This is based on the study design and history. The comment strives to demonstrate how Oliver 2005 displays dense forested plots with minimal bark beetle mortality to argue against bark beetle Hazard. Refer to comment #4 on how the 4Fri bark beetle analysis is based on promoting forest health by reducing Bark beetle hazard (likelihood of attack and damage by bark beetles) and not contesting that forested areas and bark beetles can co-exist. Regarding Cochran and Barrett (1995) see our previous discussion on the use of relevant studies in this analysis for SDI-related bark beetle hazard. The FEIS discusses the applicability of the literature provided in this comment in Chapter 3.

Hanson, Chad

The DEIS Fails to Consider Well-known Recent Science on the Invalidity of the Fire Regime Condition Class Model The DEIS (p. 25) bases its fire analysis fundamentally on Fire Regime Condition Class (FRCC), which is a model that attempts to assess, in essence, the number of natural fire return intervals that have been "missed" due to fire suppression. The FRCC model assumes that the areas that have missed the highest number of fire intervals (FRCC 3) will burn unnaturally severely (much more than FRCC2, e.g.), with predominantly high-severity fire effects. However, the DEIS fails to divulge the fact that every single scientific study that has empirically tested the FRCC model has found it to be invalid, and all studies have concluded that the areas with the highest FRCC ratings burn predominantly at low/moderate-severity, and do not burn more severely than areas with lower FRCC ratings (Odion et al. 2004, Odion and Hanson 2006, Odion and Hanson 2008, Odion et al. 2010, Miller et al. 2012, van Wagtendonk et al. 2012). The DEIS (p. 191) also uses this invalid FRCC model to justify intensive logging in Mexican Spotted Owl habitat and PACs, and fails to divulge and identify the risks and trade-offs of this approach, choosing instead to imply that the FRCC model is fully reliable.

(148-5) FRCC is mentioned on approximately 3 ½ pages, scattered throughout the 716 pages of the DEIS. It is one of several metrics used to in the fire analysis, and is in no way 'fundamental' to the fire analysis. See Specialists' report (metrics used are described on pages 15 – 23 in the Fire Ecology, Fuels & Air Quality report).We are not sure which studies are included in 'every single scientific study', as they are not listed. For a given biophysical setting, an FRCC assessment combines fire regime departure (frequency and severity) with vegetation departure (seral stages) between the reference (historical) and current periods. Simply put, FRCC = similarity to reference conditions (in regards to fire regime and vegetation). A low rating (FRCC1) means that key ecosystem components are intact. A high rating (FRCC3) implies that key ecosystem components are at risk. FRCC is not a measure of fire risk. The classes are based on changes (from reference conditions) in age, structure, species composition, and stand density and are used to quantify the condition of the land resulting from fire exclusion and other influences (timber harvesting, grazing, fragmentation, insects, disease, and the introduction and establishment of non-native plant species).In response to the steady increase of large and high severity wildfires the FS and Interior developed the National Fire Plan and used the 2000 FRCC definition and maps. The Healthy Forest Initiative used the 2000 FRCC definition and maps and a 2002 finer-scale estimate of FRCC of 190 million acres on federal lands of CC 3. The Healthy Forest Restoration Act used similar information and incorporated direction for use of the Interagency FRCC guidebook for assessment, inventory, monitoring, and reporting. In addition FRCC has been adopted as a federal agency Performance Measure. (Schmidt et al. 2002, Hardy et al, 2000).Understanding, maintaining and restoring ecosystems requires some level of "base datum" for understanding how the land functions in a healthy condition - reference conditions (Fule et al., 1997; Swetnam et al., 1999). There are a multitude of studies specific to southwest ponderosa pine and to the Coconino/Kaibab spanning the last six decades. These studies show that the fire regime in southwestern ponderosa pine was a frequent fire return interval of low intensity/low severity surface fire. That does not necessarily mean there was no crown fire, but it was the exception. Additionally, it is/was the effects of land management (including fire suppression) over the last century that

allowed the forest structure to become unnaturally dense, resulting in the potential for large, high intensity fires over large areas (Allen et al., 2002; Cooper, 1960; Covington and Moore, 1994; Fule et al., 1997; Fule et al., 2001; Heinlein et al., 2005; Mast et al., 1999; Savage and Mast, 2005; Weaver, 1951). Estimates of the fire return interval in the project area range from 2 to 22 years (Dietrich and Swetnam, 1998; Fule et al., 1997; Fule et al., 2003; Swetnam, 1990; Swetnam and Baison, 1996; Van Horne and Fule, 2006). However, in Odion and Hanson 2008, there is no specificity in terms of the types of forest. 'Conifer' forests are not all equal in fire regimes, so the information in that paper is irrelevant and it incorrectly infers that, in effect, all conifer forests can be classified together regarding fire regimes. Odion et al. (2004) discusses fire in northern California. Odion et al. 2010 discusses the relationship of sclerophyllous vegetation with 'forested' areas in north-western California. Ponderosa pine has distinct variability's within its geographic range (refer to Oliver, W.W. and R.A. Ryker. 1990. Pinus ponderosa. Pp. 413-424 in R.M. Burns and B.H. Honkala (technical coordinators) Silvics of North America, Vol. 1. Agri.Handbook 654, USDA For. Serv., Washington, D.C.), and the populations of ponderosa pine in northern Arizona have some fundamental genetic differences (Conkle and Critchfield, 1988 Genetic Variation and Hybridization of PonderosaPine' in Symposium Proceedings). Miller et al. (2012) state that fire size and frequency are on the rise but, though fire size and frequency are important, they do not necessarily scale with ecosystem effects of fire, as different ecosystems have different ecological and evolutionary relationships with fire. They further conclude that the percentage of high-severity fire in 'conifer-dominated' forests was generally higher in areas dominated by smaller-diameter trees than in areas with larger-diameter trees. Additionally, they found that "where fire has been excluded for many years, less severe effects are frequently noted in mature Douglas-fir forests than in mature ponderosa pine forests…" VanWagtendonk et al. (2012), concluded that "At the lowest elevations, the lower montane zone…consists of a mix of ponderosa pine…and Douglas-fir…and white fir… . Low to moderate severity surface fires are relatively frequent in the lower montane zone…. That is the only reference to ponderosa pine. Douglas-fir and ponderosa pine have very different morphologies, producing very different flammability. Douglas-

Hanson, Chad	The DEIS Fails to Consider Well-known Recent Science on Spotted Owls and Wildland Fire The DEIS's section on Spotted Owls (pp. 178-191) attempts to justify the landscape-level intensive logging in	fir has smaller, denser needles and branches, making it a much more effective ladder fuel than ponderosa pine. Overall, these findings support the conclusions of the 4FRIanalysis. For wildlife, the use of FRCC does not justify anything but it is used as part of the disclosure of predicted effects of implementing the proposed action. Under NEPA, an action is driven by the purpose and need for a project (see chapter 1:"Purpose and Need," pages 1 – 45). More specifically, the need for treating in MSO habitat is discussed on pages 179 – 180. In this description of current conditions is a reference to predicted fire behavior, not FRCC. Existing conditions indicate 36 to 43% of MSO habitat is at risk of crown fire. The disclosure of effects from the action and no action alternatives on MSO habitat can be found on pages 180 – 189 and from there the disclosure of effects moves to MSO critical habitat. During the course of the analysis of effects of the proposed alternatives to MSO and their habitat is a single paragraph discussing the change in FRCC post-treatment. FRCC is used as a comparison method among action and no action alternatives. Whatever the strengths or weaknesses of this measure, the bias is equal and provides an objective assessment of the differences between alternatives relative to reference conditions in regards to fire regime and vegetation. Most of the discussion of direct and indirect effects focuses on changes to forest structure both in terms of overstory components and prey habitat. An important aspect of MSO habitat is the understory vegetation that provides food and cover for an array of MSO prey species. Whereas understory response in ponderosa pine habitat of northern Arizona can equal 100s of pounds per acre after the overstory is opened (see appendix 8 of the wildlife specialist report), the modeled changes in MSO protected, target, and threshold habitats is measured in 10s of pounds. This in itself is a strong statement regarding the careful and limited entries developed for proposed mechanical treatments. The statement made in the comment letter regarding the "intensive logging in Mexican Spotted Owl habitat" is therefore not applicable to this project. The FEIS discusses the applicability of the literature provided in this comment in Chapter 3. (148-6) High-severity fire is considered detrimental to MSO and their habitat. Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: historical alteration of its habitat as the

Mexican Spotted Owl habitat and PACs by claiming/assuming that high-severity fire, and even mixed-severity fire, is inherently and categorically damaging to Spotted Owls. However, the DEIS fails to divulge or analyze the well-known scientific studies that have found that mixed-severity fire, including high-severity fire patches, do not reduce Spotted Owl occupancy (where such areas are not subjected to post-fire salvage logging), and in fact the owls preferentially select high-severity fire areas for foraging due to an enhanced small mammal prey base in complex early seral forest habitat created by high-severity fire, and reproduction is 60% higher in mixed-severity fire areas than it is in unburned forest (Bond et al. 2002, Roberts 2008, Bond et al. 2009, Lee et al. 2012) (annotated references for these citations are below). The DEIS simply fails to take the required hard look at impacts, in light of this.

result of timber-management practices; and the danger of stand-replacing wildland fire (USDI, 2012 p vi). The Revised Recovery Plan incorporates new information on the biology, threats, and habitat needs of the spotted owl. The MSO recovery team concluded that the primary threats to its population in the U.S. have transitioned from timber harvest to an increased risk of stand-replacing wildland fire. The Revised Plan states that forest management emphasizing sustainable ecological function and a return toward pre-settlement fire regimes are more compatible with maintenance of spotted owl habitat conditions than the even-aged management regime practiced at the time of listing. Conversely, southwestern forests have experienced larger and more severe wildland fires from 1995 to the present than previous to 1995. The Center for Biological Diversity summarized these recent fires in MSO habitat as follows: "In 2011 and 2012, a number of large wildfires and related fire suppression activities in the Southwestern Region may have adversely affected Mexican spotted owl and its critical habitat. These include the 538,000 acre Wallow fire on the Apache-Sitgreaves National Forests, the 222,954 acre Horseshoe Two fire and the 68,078 acre Murphy Complex fires on the Coronado National Forest, the 156,593 acre Las Conchas fire on the Santa Fe National Forest, the 297,845 acre Whitewater-Baldy Complex fires on the Gila National Forest, and the 44,330 acre Little Bear fire on the Lincoln National Forest" (CBD comment letter to 4FRI).The comment identifies different classes of fire severity, but then provides a generalized conclusion regarding fire effects and spotted owls. While MSOs have long been known to have high site fidelity, there is no research documenting whether this works to the benefit or detriment of MSO populations, i.e., whether this site fidelity serves as source or sink habitat. Reproduction and survival, key elements in predicting population growth, are unknown. It is thought that MSO tend to use habitats featuring cool microsite because they do not dissipate heat as efficiently as Great Horned Owls (GHOs; Ganey et al. 1993), which are adapted to open habitat. While foraging habitat can be improved by opening forest canopies, results of mixed and high-severity fire can turn closed forest habitat associated with MSO into GHO habitat. GHOs will prey on the smaller MSOs. Similarly, post-fire conditions from mixed and high-severity fire move forest conditions towards habitat used by goshawks

		and red-tailed hawks and these species can also prey on MSOs. While prey species increase in these post-fire landscapes, there is no data on whether this improves or detracts from population trends of MSOs. Occupancy alone does not address population dynamics and the ability to maintain or recover MSOs. Significant omissions occurred in the brief literature provided. Most importantly, climate variability combined with current forest conditions may also synergistically result in increased loss of habitat from fire. The intensification of natural drought cycles and the ensuing stress placed upon forested habitats could result in even larger and more severe wildland fires in owl habitat. The FEIS discusses the applicability of the literature provided in this comment in Chapter 3.
Hanson, Chad	The DEIS Fails to Consider Well-known Recent Science on Historic Forest Density and High-severity Fire Extent The Silviculture Report, relied upon by the DEIS, states, under the heading of "Desired Conditions" (in the project area), that the historic (pre-fire suppression) forests in the project area were very open and had only about 2 to 40 trees per acre, with a general average of about 23 trees per acre (Silviculture Report, pp. 54-55), relying upon spatially-limited studies using small areas and small plots. However, the DEIS fails to mention, let alone analyze, the only landscape-level studies ever conducted in northern Arizona—studies that use actual historical plot data across vast areas. Specifically, I refer to Williams and Baker (2012) and Williams and Baker (2013), both of which used extensive U.S. General Land Office field data from the 19th century to assess historic forest structure and fire patterns. Williams and Baker (2012) was conducted in the Kaibab and Coconino National Forests around Williams and Flagstaff (and southeast of Flagstaff)—in the largest portion of the 4FRI project area. They found that the historic forests were dominated by areas with 89-134, 134-178, and >178 trees per hectare over 10 centimeters in diameter at breast height (36-54, 54-72, and >72 trees per acre) (Williams and Baker 2012, Figure 2). Over 25% of the forest had more than 178 trees per hectare (more than 72 per acre). In Williams and Baker (2013), conducted around Tusayan—in the smaller, northernmost portion of the 4FRI project area—they found that historic forests were dominated by areas with 100-150, 150-200, and 200-391 trees per hectare over 10 centimeters in diameter at breast height (40-61, 61-	(149-5) This letter is a duplicate of letter 143. Please see all responses in 143.

	81, and 81-158 trees per acre). The DEIS violates NEPA by failing to fully and completely consider these findings or incorporate the findings into the proposed action. Moreover, the DEIS fails to clearly divulge what the post-logging trees per acre would be in most of the areas proposed for logging in the project area. Further, the DEIS (p. 158, Table 58) states that the Proposed Action and Preferred Alternative would result in only 1-2% active crown fire (high-severity fire), and only 3% passive crown fire (mixed-severity fire). Williams and Baker (2012) found that the historic forests had 15% high-severity fire effects and 23% mixed-severity fire effects (Williams and Baker 2012, Table 2), indicating that the action alternatives would not restore historic fire regimes but, rather, would take forests outside of the natural, historic range of variability, compromising ecological resilience. This information, though well known to the Forest Service, is simply not addressed in the DEIS, in violation of NEPA.
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Chad

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Hanson, Chad

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	range of variability, compromising ecological resilience. This information, though well known to the Forest Service, is simply not addressed in the DEIS, in violation of NEPA.	
Harger, Scott	1. This DEIS is a very impressive accomplishment. Despite its unprecedented scope, the collaborative effort associated with 4FRI has made it very familiar and relatively easy to follow, 700 plus pages notwithstanding. We are particularly pleased with the appendices C, F, and G. CNRCD hopes that Alternative C will be chosen to implement the much needed restoration of this portion of the 4FRI.	(176-1) Thank you for all the time and attention you have provided throughout the planning process.
Harger, Scott	2. That same familiarity has raised our confidence level considerably. As a stakeholder in the 4FRI collaboration, we have considered and endorsed the comments submitted by that organization. We think that the DEIS evaluation committee and subcommittees were also the beneficiaries of the extended collaborations, and have submitted a very minimalist set of comments. From the CNRCD standpoint, we wish to emphasis our interest in the USFS responses to 4FRI Key Issues 1 (Degree of Openness) and 6 (Monitoring and Adaptive Management.)	(176-2) Thank you for your comments. We have addressed your comments on openness and monitoring and adaptive management below.
Harger, Scott	4FRI Issue 1 (Openness.) Since the success of implementing this vast project is largely a product of how treatments are implemented at the stand level, we will be looking hard at the response to collaborative comments regarding quantification of openness, operator training, monitoring, and adaptive management.	(176-3) Thank you for your comment and concern. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during

implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when

Harger, Scott	4FRI Issue 6 (Monitoring and Adaptive Management.) We always try to stay focused on implementation, impacts, and mitigation when we review an EIS. It is hard for us to know if we should expect the Implementation Plan or the Monitoring and Adaptive Management Plan to be more complete at this stage. Again, we will be looking very hard at the USFS responses to all five recommendations under Key Issue 6, (Monitoring and Adaptive Management,) of the 4FRI Comments.	(176-4) Thank you for your comments. We have made considerable progress since the DEIS. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on Mexican spotted owl and will be used to inform adaptive management. A description of these protocols is included in appendix E.
Harger, Scott	3. CNRCD is a long-time member of the Greater Flagstaff Forest Partnership (GFFP) and sits on their board. We have reviewed their comments, and endorsed them.	(176-5) Thank you for your information. Also see our response to their comments.
Harger, Scott	4. CNRCD has the following specific comments and requests to make: Page 24: Is there a need to “reduce excessive surface fuel loadings in areas adjacent to and within…” values at risk besides MSO habitat, like WUI’s, streamside protection zones, recreation infrastructure, nest sites, and other patches of “dense” forest? We suspect the answer must be yes and needs expansion for the FEIS.	(176-6) This discussion was intended to be a fairly general discussion of need within the project area. The FEIS (pp. 22-23) has been updated and addresses acres within or next to Mexican spotted owl habitat, wildland-urban interface areas, water resources and wildlife assemblages.
Harger, Scott	Page 38 1st Para under Response: It is unclear how elements of the Vegetation Analysis have been incorporated. Is it referenced? The	(176-7) Thank your for your recommendation. The Issue 2 response in the FEIS now includes a statement that clarifies the vegetation analysis adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

	results of this analysis probably made their way into one or more tables – could you include a pointer in the text?	will evaluate how proposed treatments affect vegetation structural stages, including those trees that are 16 inches d.b.h. or larger.
Harger, Scott	Pages 55-56 Grazing and Livestock bullets: Although we are nominally satisfied with the content of the bullet arguments made here regarding grazing as part of an alternative, we strongly suggest that the USFS make a fine point of the adjustments to past practices that will come from reintroduction of fire as a management tool to restored areas with grazing allotments.	(176-8) The analysis states burning up to two pastures per year would have an adverse effect to grazing management and forage until the burn area shows range readiness (DEIS, page 314). The DEIS grazing analysis indicates there would be short and long-term beneficial effects to livestock grazing from increased understory vegetation (DEIS, page 312). It also states there would be no long term, unavoidable adverse effects related to grazing because effects would be short term and would not affect grazing permit capacity (DEIS, page 313).
Harger, Scott	Page 339: “Scott Harger, NRCS” should read “Scott Harger, CNRCD”	(176-9) Thank you for your comment. In the FEIS we have corrected your title to read, Scott Harger, Coconino County NRCD. We hope this is acceptable.
Harger, Scott	Pages 397 and 689, Table 152, Grazing; Please send a copy of the Range Specialist Report, Coconino and Kaibab Four-Forest Restoration Initiative (4FRI), DEIS. Ms. Said to be on file at CNF, 4FRI project record. 44pp, to Scott Harger. E-mail preferred.	(176-10) Thank you. We responded and sent this report to you upon request.
Harger, Scott	Pages 573-575 Rangeland Management section: We are surprised to read the statement that “Restrictions in grazing of livestock would primarily occur after prescribed fire in a pasture.” We are not surprised by post-fire restrictions, but by the omission of pre-burn grazing prescriptions to allow for sufficient fine fuels accumulation to support a prescribed burn. If pre-burn restrictions are not needed or expected, would you please specifically say so? This would provide the clarity that is craved by our ranching constituency. This issue has been raised in stakeholder meetings.	(176-11) In response to comments on the DEIS, an additional mitigation measure (FE16) was added to ensure fire managers and range mangers coordinate grazing in advance of prescribed fire to ensure there is sufficient surface fuel to meet burn objectives. If grazing cannot cease long enough for sufficient fuel to build up to meet objectives, planned prescribed fires will be postponed until there can be sufficient fuel to meet objectives. (FEIS, appendix C, FE16). This is consistent with the revised Kaibab NF forest plan guideline that states, "Post-fire grazing should not be authorized until Forest Service range staff confirms range readiness" (FEIS Fire Ecology Report, p. 309).
Harger, Scott	Pages 622-625: This is another comment regarding quantification of openness, specifically proportions. We are concerned about ranging sufficiently about the median values for BA, interspaces, etc. We look forward to this discussion in the FEIS.	
Harger, Scott	Page 628, LOPFA Burn Only Treatment Design: Should say “Prescribed fire will be used…” instead of “…may be used…” This is the only case where “may” needs substitution, although we would like to see “will” used in all treatment designs.	(176-13) Thank you for the recommendation. Definitive words such as will are typically reserved for the decision.
Harger, Scott	Page 641 Prescribed fire bullets, and page 674 App E Table 145: Do the USFS fire regime or FRCC model(s) function for Pine-Sage and Grassland ecotypes? In other words, do the results change after treatment? This is important to understand so that in monitoring we	(176-14) FRCC has not been used to evaluate grassland and pine/sage. In the fire ecology section of chapter 3 (FEIS) clarification was added to explain that quantitative data for FRCC in grasslands was removed and replaced with qualitative.

	use the right criteria to measure effectiveness. Is it judged by FRCC change, or the fact that prescribed fire may be used subsequent to treatment? A brief clarification in the FEIS would be helpful.	
hart, ty	I wish to comment on the 4FRI (Four Forest Restoration Initiative) as outlined in recent news articles in Cottonwood, Camp Verde and Sedona , Arizona . I feel that the articles that were written were very poorly written with no explanation of what was to done. I believe that this slants all comments you receive, because the first alternative - do nothing - is unlikely to be chosen by responsible citizens who wish to improve our forests, and meanwhile the other three all include extensive prescribed burns. I honestly do not think this a fair survey of comments.	(130-1) Thank you for your comment and taking the time to review the project proposal. (130-2) Thank you for your comment. An alternative that would eliminate all prescribed fire was considered but eliminated from detailed study as it did not adequately meet the purpose and need for restoring the fire-adapted southwestern ponderosa pine ecosystem. Alternative B, C and E propose using prescribed fire across the entire project area and alternative C adds acres on which prescribed fires would be used to restore additional acres of grasslands. Alternative D was developed to respond to the emissions/smoke issue by decreasing the acres proposed for prescribed fire by 69 percent (when compared to alternative B). This equates to removing fire on about 404, 889 acres. All action alternatives include design criteria aimed at reducing impacts to air quality (as practicable) and increasing coordination efforts amongst neighboring forests (DEIS, appendix C). Also see our response to letter 6, 11 and 74.
hart, ty	In the years that I have lived here I have been witness to the Vast amounts of smoke that accumulates in the Verde Valley do to the burning of slash piles left over form the logging operation. I believe that the logging has helped our forest become a safer and healthier forest and am all for the thinning and logging. I do not know why the slash piles can not be taken care of more responsibly than to burn them and risk the health of thousands of people “some of which have moved to Arizona for the air quality and its effects on their health. Have there been studies on the respiratory health of the local populations since the prescribed burns have been in full swing?	
hart, ty	I plan on raising my family here and I am in full support of anything that would help our forest stay healthy as long as it does not effect to mine or my family’s health. I am sure that there are alternatives to burning in a majority of cases and ask that that is the way the Forest Service chooses; so as to be healthy for both the people that live in and around the forest as well as the forest that we live in. Thus, alternatives to prescribed burns can and must be found. I would be pleased to assist in this in any way I can	(130-3) Please see the response to letter 6, 11 and 74 and chapter 1 of the DEIS for the explanation of the necessity for using prescribed fire in this restoration project. Thank you for your comment and your offer to assist the 4FRI.
hart, ty	I would be in support of the Forest Service alternatives that do something WITHOUT prescribed burns.	(130-4) Thank you for your position.
Hatfield,	This is an outrageous industry give-away. You plan to destroy large	(82-1) Thank you for your comment. The purpose and need for the

Barry	areas of wild habitat belonging the the public for private industry profit. It's also dangerous. The managers who hatched this plot ought to be fired for malfeasance.	restoration project may be found in the DEIS on page 8.
Hemenway, Kathy	In making these comments, I'm representing myself as a local resident and property owner in Navajo County. Before I describe my specific comments, I would like to mention a couple of things.First, I do not want my comments to delay the EIS or work on-the-ground. I believe it is in everyone's best interest to move forward as soon as possible to decrease the risk of catastrophic losses from wildfire. I hope that my comments – and other stakeholders' comments -can be addressed in parallel with work moving forward	(161-1) Thank you for commenting on the 4 Fri DEIS.
Hemenway, Kathy	Second, I find in general that in information related to 4FRI, it is hard to distinguish between statements made about part of 4FRI and statements made about 4FRI as a whole. I recommend using different names consistently for the different parts of 4FRI, and reserving the term "4FRI" for the whole. That can help to minimize confusion and misunderstandings. Also, it may help to reduce the number of misdirected public comments.	(161-2). Thank you for your comments. We realize there is the potential for confusion. In the FEIS we have tried to use the terms "project or treatment area" to reduce confusion with the larger initiative.
Hemenway, Kathy	Comments on the Socioeconomics Resource Report and in Chapter 3: Socioeconomics Comprehensive, quantitative socioeconomic analysis is missing from the DEIS. The information presented is superficial. This omission is important for several reasons. First, the problem of developing treatment plans for the forests is far more constrained than it appears to be in the absence of strong socioeconomic analysis. A better understanding of the range of constraints would provide a basis for making better decisions, leading to better near- and long-term outcomes.	(161-3) We reviewed your comment but found no specific recommendation was made. It was not possible to infer recommendations from this comment.
Hemenway, Kathy	Second, socioeconomic analysis is an essential foundation for negotiating resolutions to disagreements. Without such a foundation, rumors and misunderstandings are more likely to persist, building barriers between stakeholder groups.	(161-4) Thank you for recognizing the value of the socioeconomic analysis.
Hemenway, Kathy	Third, the imbalance between the quality of ecological analysis and socioeconomic analysis in the DEIS gives the impression that ecological considerations are far more important than are the social and economic assets at risk. This is, of course, is the kind of disparity in emphasis that has polarized stakeholder groups for many years and helped to make the Mexican spotted owl the paragon of a	(161-5) Thank you for your comment. Ecological, social and economic are of importance in this project. The purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. Social and economic assets may be impacted positively or negatively in meeting the purpose of the project. Implementation is designed to lessen negative impacts while

	highly-divisive controversy.	still meeting the need.
Hemenway, Kathy	Fourth, the inclusion of quantitative, science-based social and economic analyses would bring the EIS better into alignment with requirements in the Forest Service Handbook for use of best available science, which includes not just ecological science, but the social and economic sciences as well.	(161-6) Thank you for your comment. Please see comment responses 161-7 through 161-10 to understand how the Socioeconomic Report is in alignment with Forest Service policy and the best available science.
Hemenway, Kathy	Inclusion of the wrong set of counties (including Maricopa and excluding Gila);	(161-7) Gila County will be included in the second stage analysis (Tonto NF and Apache-Sitgreaves NF). It is not included in this analysis due to geographic distance from proposed treatments and limited economic connections with the counties in the treatment area. Maricopa County is included in the economic analysis due to the economic linkages (labor and trade flows) between Maricopa County and the counties in the treatment area. Maricopa County is a center of regional economic importance, which may provide labor and inputs to 4FRI-related activities. Therefore, it's inclusion in the economic analysis is important to accurately estimating the employment and income consequences of 4FRI-related activities.
Hemenway, Kathy	o Lack of focus on communities most affected by forest-management decisions and wildfire risk	(161-8) The environmental justice analysis specifically addresses smoke-sensitive communities (DEIS pg. 278). Quantitatively precise and accurate forecasts of social consequences at the community-level are not possible due to uncertainty about the exact location, size, and intensity of future wildfires. Therefore, consequences on communities are based on peer-reviewed literature that assesses the social and economic consequences of wildfire and smoke emissions on health, property values, and tourism. The economic impact analysis is not specific to communities, because labor and trade flows cross community and county boundaries. However, the economic impact analysis does identify communities that may experience particular economic effects from harvesting and processing (DEIS pg. 281).
Hemenway, Kathy	Inappropriate aggregation of data (e.g., aggregation of employment-byindustry	(11-9) All of the data in the affected environment section is presented at the county-level to capture variation between counties. Disaggregation of data in the environmental consequences section is inappropriate because it would fail to capture economic linkages between counties. Counties are political designations, not economically-meaningful units of analysis. Therefore, the input-output analysis uses an aggregation of counties to capture the trade and labor linkages between counties. This aggregation is essential to properly

Hemenway, Kathy	? Incomplete quantitative exploration of: o Resources and assets by distance from forest boundaries, including private property values, water supplies, and infrastructure, among others; o Potential impacts of fires on tourism at Grand Canyon National Park, and consequent regional impacts; o Time-based analysis of changes in wildfire risks and associated forecasts of socioeconomic impacts.	estimating the employment and income consequences of 4FRI-related activities. Two figures in the specialist report aggregate employment specialization data to reflect conditions in the entire study area (economic unit). However, both the specialist report and EIS describe economic drivers by county in the text (DEIS pg. 274). (161-10) The fire ecology section of the EIS describes fire behavior by restoration unit (DEIS pg. 150) and they key infrastructure (airports, highways) and water supplies (e.g., Lake Mary) within the units. Additional community-level detail on important resources and assets has been added to the "Environmental Consequences" analysis in the socioeconomics section of the EIS. The "Environmental Consequences" analysis of the socioeconomic section of the EIS has been updated to incorporate data on the economic impact of visitation to Grand Canyon National Park and how this could be affected by wildfire under alternative A. Additional detail on community-level effects of wildfire has been added to the "Environmental Consequences" analysis of the socioeconomics section of the EIS based on the analysis contained within the fire ecology section. However, the analysis is largely qualitative due to uncertainty about the precise location, size, and intensity of future wildfires.
Hemenway, Kathy	Comments on Chapter 1, Page 7, Paragraph 2 under “4FRI Background” There are important inaccuracies in the following paragraph:The communities that surround the four national forests engaged in the 4FRI project are economically and socially diverse. Apache, Coconino, Gila, Graham,Navajo, and Yavapai Counties have economic bases in consumptive industries,agriculture, tourism, and services to retirees. With this diversity has come an increasingly divergent vision of how to manage public lands and how to respond to the threat of uncharacteristic wildland fires. While the stakeholders may not always agree, there is strength in having stakeholders who can provide a wide range of potential solutions when working with the Forest Service. Specifically, the following are problematic: ? The description of the economic bases of communities; ? The implication that local communities are the only stakeholders; ? The statement that views are increasingly diverging; ? The statement that local communities and their different economic bases are the source of disagreements; ? The implication that on-	(161-11) Thank you for your comment. The paragraph on communities and stakeholders (chapter 1 background) has been edited to more accurately capture the economic drivers in the 4FRI project area and describe how stakeholder diversity affects the collaborative process. Additional detail on community-level effects of wildfire has been added to the "Environmental Consequences" analysis of the socioeconomics section of the EIS based on the analysis contained within the fire ecology section. However, the analysis is largely qualitative due to uncertainty about the precise location, size, and intensity of future wildfires. The following language has been added to the socioeconomic portion of the EIS (DEIS pg. 291): "The costs of a single large fire may greatly exceed annual wildfire expenditures listed above. The Forest Service, for instance, spent approximately $14.4 million responding to the 2010 Schultz Fire (Combrink et al 2013). Furthermore, the total cost of the Schultz Fire – including decreased property values, loss of life, cleanup, evacuation, and habitat destruction – is estimated to be between $133 million and $147 million (Combrink et al 2013).

	balance these disagreements provide benefits to the Forest Service, rather than costs to everyone. ? The scoping of this paragraph to 4FRI as a whole, rather than to the 4FRI forests addressed in this DEIS.	Therefore, economic benefits of 4FRI described here should be viewed as lower-bound estimates." Also see our previous responses which describe the updates and clarifications that will be made to the socioeconomic specialist report.
Hemenway, Kathy	Statements such as these increase the polarization between groups with competing perspectives. In contrast, accurate descriptions of stakeholder groups can help correct misunderstandings and make it easier for stakeholders to solve shared problems collaboratively.	Thank you for your comment.
Hemenway, Kathy	We each need to be realistic about our own self-interests, to do our best to understand others perspectives, to be honest and fair, and to work together in good faith toward the common interest.	(161-13) Thank you for taking time to comment on this project.
Hicks, Bethany	While I appreciate the goals of the Four Forest Restoration Initiative (4FRI) that focus on increasing the use of prescribed fire and protecting wildlife habitats and communities, I have some concerns with the way the project is being proposed. I hope the Forest Service will address these concerns in its Final Environmental Impact Statement and Implementation Plan.	(19-1) Thank you for your comment and for agreeing with the purpose and need for this important restoration project.
Hicks, Bethany	The Forest Service is vague about exactly how open the forests will become after treatment. Because the Forest Service will define the various forest openings as different and non-overlapping for the purpose of this project, the forest could end up far more open than the plan implies. The Forest Service should provide specific guidelines for the sizes of these openings and how much openness can be created cumulatively by these openings combined. Also, guidelines should be provided so that tree group and forest opening sizes are varied and so that contractors cannot create identical patterns all across the project area.	(19-2) Thank your for your comment. The DEIS defines openness as interspace (web-based DEIS, page 347). The DEIS explains the treatment types and associated openness by disclosing the treatment descriptions, objectives and acres in three tables: Table 17 for Alternative B (web-based DEIS, page 71) Table 24 for Alternative C (web-based DEIS, page 83) and Table 27 for Alternative D (web-based DEIS, page 90). Openness in these tables is described where it is an objective. The DEIS (web version) on page 97 compares and summarizes openness by alterative. Table 40 in the DEIS (web version, page 126) compares the alternatives relative to attaining interspaces and tree groups by acres. This table displays the treatment intensity to treatment type. The DEIS (web version, page 124 to 125) describes canopy density and openness as follows: In alternative A and in the absence of restoration treatments, existing openness is expected to continue on the same trajectory with at least 75 percent of the ponderosa pine classified as moderately closed to closed by 2020 (table 39). As the forest develops over time and existing conditions change, some of the areas would move from a moderately closed to closed condition. No treatments would be implemented to create a mosaic of interspaces and tree groups. Existing interspace would continue to be encroached upon by expanding tree

crowns and ingrowth. Any large scale tree mortality occurring has the potential to enhance interspace and create tree groups. In alternatives B and D there would be a fairly diverse condition with openness leaning to the closed side of the range. Eleven percent of the ponderosa pine would be very open, 31 percent open, 42 percent moderately closed, and 15 percent closed (table 39). The unknowns are those areas with no treatment proposed under this alternative. In alternative C, there would be a fairly diverse condition with openness leaning to the closed side of the range. Eleven percent of the ponderosa pine would be very open, 30 percent open, 42 percent moderately closed, and 17 percent closed. In addition to this analysis, wildlife conducted an evaluation of post-treatment canopy openness for canopy density dependent species. The analysis is summarized in the "Wildlife" section. The complete analysis is in appendix G of the DEIS. The Habitat Connectivity analysis summarized in the DEIS (web version, page 174) states, "Using the post-treatment vegetation modeling output and extensive list of design features that would be incorporated into project implementation, the wildlife analysis evaluated potential impacts to habitats. In summary, the evaluation found that adequate areas of densely forested habitat would remain available to wildlife adapted to closed canopy conditions during the period of time between 4FRI treatments and the actual attainment of desired conditions across the broader landscape. This habitat would bridge the time between treatment and attaining truly sustainable forest conditions, allowing species adapted to closed canopies to adjust, adapt, or eventually relocate over time rather than face an abrupt transition in forest conditions. This bridge habitat would include about 13 percent of the landscape within the 4FRI project boundary that would be deferred from treatment. Nearly 42 percent of the ponderosa pine treatment area would have a moderately closed canopy and 17 percent would remain in a closed condition. Another 17 percent of the treated area would have a mix of open and closed conditions. Restoration units near the Mogollon Rim would provide the greatest percentage of bridge habitat after treatment. In addition, landscape-scaled corridors would be designated to account for movement of closed canopy species across the area. The complete analysis for bridge habitat for canopy-dependent wildlife can be found in appendix G of the DEIS and appendix 3 of the wildlife report". In the

Hicks, Bethany	Stakeholders, including Sierra Club and other conservation groups, created a document to specify that old growth would be protected and to identify specific situations when rare large trees could be cut. The Forest Service should make this document an integral part of the proposed action.	FEIS, and in response to comments received on the DEIS, additional narrative (designed to provide clarity) on post-treatment openness as it relates to habitat connectivity will be included. The percent of openness expected post-treatment will be displayed at the landscape scale and by habitat type. The vegetation and wildlife report will be updated accordingly. Appendix D in the DEIS is the Implementation plan for Alternatives B through D provides specific guidelines for sizes of openings and how much openness can be created (web-based DEIS, page 601-657). The specific guidelines for opening sizes are displayed by the average range of interspace width (in feet) by the distances between tree groups. This is disclosed in DEIS Table 120, 123, 126, 130, 133 and 136. The specific stocking guidelines for 'how much' openness can be created is in DEIS Table 119, 122, 125, 127,129, 132 and 135. The variable averages in these multiple tables would ensure that opening sizes would not exhibit identical patterns across the project area. (19-3) The Forest Service considers old growth habitat, old trees and large trees as an integral, very important and necessary, part of the forest in the project. This is why the forest plans, purpose-and-need and the desired conditions reflect these values. See the following sections in the web-based DEIS: Section C - Old Tree Implementation Plan (DEIS Appendix D, page 644), Section D - Modified Large Tree Implementation Plan (DEIS Appendix D, page 646), Mexican Spotted Owl (MSO) Habitat (DEIS Chapter 1, page 14), Old Growth Habitat (DEIS Chapter 1, pp. 14-17), Vegetation Structural Stage - Age and Size class Diversity (DEIS Chapter 1, page 11) and Goshawk Habitat (DEIS, Chapter 1, page 12).We incorporated the stakeholders' documents into the DEIS (see Appendix D, Old Tree Implementation Plan, page 644). The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D on pages 613-629, 631-637 and 637-641. Examples of treatment design include, "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 625). Page 626 of the implementation plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in

size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range". The DEIS (web version) included specific treatment designs that manage for the sustainability of large trees in appendix D on pages 610-614, 618-620, 622-627, 629-630 and 632-634. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: Restoration treatments proposed in alternatives B, C and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section of the implementation plan.

Hicks, Bethany	The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival.	(19-4) We agree that the adaptive management and monitoring plan in the DEIS was not complete. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E of the FEIS. Table 44 of the monitoring plan identifies monitoring questions that were derived from desired conditions and triggers for various resources including (but not limited to) vegetation, soils and water, recreation, scenery, wildlife and plants. This table is followed by a detailed biophysical and socioeconomic monitoring plan.
Hicks, Bethany	The Forest Service should be sure that metrics and measurements are applied consistently across the Environmental Impact Statement and during implementation. The Forest Service should not apply tools designed to measure and treat large stands of trees at the scale of smaller tree groups. An example of this is the vegetation structure stage (VSS) it is unclear at what scale tree size deficiencies and excesses will be determined. Also, scales and metrics should be consistently applied so that pre-treatment forest measurements can be compared to the predicted post-treatment maps.	(19-5) Thank you for your comments concerning scale of analysis. The modeling program used for the vegetative analysis is the Forest Vegetation Simulator (FVS) (http://www.fs.fed.us/fmsc/fvs/). The FVS is a non-spatial, individual tree, distant independent, model used for predicting forest stand dynamics used extensively by the USDA Forest Service. The base unit for characterizing vegetation conditions is the stand. All lands within the Coconino and Kaibab National Forests have been delineated into stands based on similar characteristics such as vegetation type, slope, aspect, tree density, species composition and management history. Stands vary in size, depending upon their uniformity, usually from 10 acres up to several hundred acres. Spatial and general vegetation information about each stand is stored in the stand data base for each forest. The FVS model, being distant

		independent, models individual trees (and other components) regardless of the spatial arrangement. All outputs are expressed in terms of attributes per acre (i.e., trees per acre, basal area per acre, distribution of VSS per acre, etc.). The VSS attribute is like any other calculated forest attribute and is described at any scale, depending on the underlying inventory plot data. This means that we can model stands (the basic unit of management within the Forest Service), groups of trees, individual Restoration Units (or sub-units), stratum with a project, or the landscape defined by a large project all with statistical accuracy. Therefore, the FVS model is appropriate to model at all scales (fine-, mid-, or landscape-scale): the scale is defined by the context of the discussion and the underlying inventory data. The Silviculture Specialist Report includes a "Methodology, Assumptions and Limitations" section that addresses the concerns raised. A Certified Silviculturist will evaluate every stand before implementation of a treatment and develop a treatment prescription. This silviculture prescription will be used to evaluate the post-treatment efficacy. The implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. The FVS model is ideal to evaluate pre-and post-treatment measurements consistently. The FVS model, based off on field verified plot inventories or a most similar neighbor statistical analog (see Silviculture Specialist Report), describes current forest structure and future expected structure based on modelled treatments. With post-treatment monitoring, treatment efficacy data are compared in the same format.
Hicks, Bethany	Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	(19-6) Thank you for your comments.
Hicks, Bethany	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement.	(19-7)Thank you for commenting on the project.
Hilding, Nancy	) Permitting 10 years worth of timber sales (607 square miles of logging and 517 miles of road construction) in Arizona using a single Environmental Impact Statement (EIS) is a too far reaching use of one EIS. If the Decision is signed and withstands appeal and litigation, this illegal scheme to log massive areas with inadequate analysis will be used in other national forests across America. This should be broken into smaller pieces.	(24-1) Thank you for your comment and opinion. However, insufficient information was provided to determine the cause-effect relationship between the proposal and the perceived analysis inadequacies.
Hilding,	Please discuss the effect of these massive timber sales on	(24-2) Chapter 3 of the DEIS (web version) addresses both short and

Nancy	“restoration ” of timber company profits. Please fully disclose long term costs to the tax-payer, such as long term thinning, water quality protection or road repair that may be needed in the future as a result of actions taken in the timber sale. Please consider these connected actions.	long term environmental impacts to resources on page 105 through page 331. All actions that are "connected" to the alternatives have been disclosed (see web-based DEIS, Chapter 2, page 62 to page 94). Pages 279 of the DEIS (web version) describes the cost to government from the continuation of Alternative A, No Action, “Historically, the Coconino and Kaibab NFs have annually spent an average of $7,154,801 and $4,456,770 on wildfire, respectively. Under alternative A, wildfire suppression costs would, on average, increase due to fuel buildup and the expanding wildland-urban interface. The per acre administrative burden (cost of time and other resources) of planning, implementation, and monitoring forest restoration activities would be highest under alternative A. The 4FRI benefits from economies of scale —a single environmental compliance document addresses nearly 600,000 acres of restoration activities. Furthermore, the large treatment area reduces cost to government through increased private sector interest in engaging in harvesting and restoration activities on the forests. In contrast, restoration activities under alternative A would occur piecemeal, requiring numerous environmental compliance documents and increased administrative costs. The cost to the government to treat an area equivalent to the 4FRI project area would be approximately $12 million annually. Discounted at 4 percent over a 10-year period, this is equivalent to a cost of more than $100 million. In contrast, the certainty of a sustained supply under the 4FRI would encourage private sector restoration, significantly reducing costs to government" (web-based DEIS, page 279). Table 87 (web-based DEIS, page 280) provides economic effects relative to Alternatives B-D. The DEIS states, "Table 87 summarizes the net present value of the 4FRI treatments. Over the 10-year treatment period, assuming a 4 percent discount rate, the 4FRI would be expected to produce a $100 million benefit. This would be the discounted cost savings to the government of the 4FRI relative to the average cost per acre that the government pays for restoration treatment. This figure can be viewed as a proxy for the economic value of the 4FRI treatments". Soils and water quality impacts can be found on page 109 to page 121 of the DEIS. The environmental consequences for Alternative C (preferred) water quality states, "Minor, short-term adverse effects to water quality are possible in water bodies within and adjacent to mechanical vegetation and grassland restoration treatment

Hilding, Nancy	I object to removing language that limits the logging in Mexican Spotted Owl protected activity centers. I object to removing the requirement that the USFS wildlife biologists monitor Mexican Spotted Owl population levels and habitat effectiveness before and after the logging. I object to allowing the USFS to reduce the amount of designated pine-oak Mexican Spotted Owl protected habitat. I object to eliminating the need for a US Fish & Wildlife Service biological opinion for the Mexican Spotted Owls in the timber sale area. Please propose an alternative that does not create any of the above amendments to the forest Plans (which would allow such variances) and select that alternative instead.	areas. Steinke (2013) estimates soil disturbance of 3.4 percent at the 6th HUC level and 10.9 percent across the treatment area. Overall effects to surface water quality would be similar to alternative B. BMPs and soil and water design features would minimize or mitigate most adverse effects to water quality or riparian areas" (web-based DEIS, page 115). Transportation-related impacts are located on page 109 to page 121 of the DEIS. It is expected that the transportation system would be maintained as needed during the life of the project. All action alternatives include an adaptive management plan that includes roads. Table 16 in the DEIS lists possible management actions to ensure soil condition moves towards desired condition (web based DEIS, pp. 65-70). The DEIS includes an implementation plan that is designed to insure treatments are consistent with the NEPA analysis. The DEIS states, "This implementation plan is designed to be integral to the selected alternative and record of decision (ROD). The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Table 112 to table 115 is checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Implementation plan" (web-based DEIS, Appendix D, page 601). (24-3) Thank you for your comment. The DEIS states that treatments in alternative C (preferred alternative), includes recommendations from the U.S. Fish and Wildlife Service (FWS) by increasing prescribed burning treatments within protected Mexican spotted owl (MSO) habitat (to improve the quality of owl roosting and nesting habitat), and aligning treatments in threshold habitat with the "Mexican Spotted Owl Recovery Plan, First Revision" (USDI 2012) (DEIS, page 47). Alternatives B-D included forest plan amendments. In response to comments on the DEIS, an alternative that proposes no forest plan amendments was developed (alternative E). In the FEIS, each resource discloses the effects associated with omitting plan amendments. The biological

Hilding, Nancy	4) With less than 2000 owls known to exist , the bird is listed under the Endangered Species Act as threatened. The USFS's cavalier attitude toward owl habitat protection is likely to drive the Mexican Spotted Owl to extinction. Please fully explore the impacts of the proposal on the Mexican Spotted Owl and it's continued survival.	assessment for the project was submitted to the FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing key habitat components for MSO and their prey. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project "may affect and is likely to adversely affect MSOs and their habitat, g critical habitat", (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS found the selected alternative will not jeopardize the continued existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat (USDI FWS 2014, page 33). Appendix E of the FEIS includes monitoring protocol for MSO that was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. (24-4) The existing condition and environmental consequences associated with Mexican spotted owl and its' habitat is disclosed (summarized) in the DEIS (web version) on the following pages: 123, 134-137,143-146,150, 159-161, 174,178-193. The wildlife specialist report addresses Mexican spotted owl on pages 71-93, 184-322, 468-

Hilding, Nancy	) Please be sure to discuss impacts on visual quality and high end ROS classes (primitive and semi-primitive ROS classes). Please protect visuals and high quality non-motorized recreation.	469, 489-516, 597-599. The biological assessment for the project is located in the project record. Also see our response to a previous comment, 24-3, for details on the FWS biological opinion. (24-5) The DEIS (web version) addresses impacts to recreation settings (ROS) on pages 287 to 297. The DEIS states, "Direct and indirect effects to recreation settings from mechanical treatments would result in short term (immediate to 5 years), temporary changes in up to 72 percent of ROS settings quality (urban to roaded natural) in the project area. The short-term effects would persist one or more seasons until activity slash is treated and the treated area recovers to an “unaltered” or “undisturbed” natural appearance" (web-based DEIS, page 287). The DEIS states on page 288, " Effects of mechanical treatments are expected to take longer (immediate to 10 years) to recover in the two semiprimitive ROS settings since these would have less evidence of treatment or development to begin with and would require more time to naturalize. Twenty-eight percent of the project area is in the two semiprimitive ROS settings in the project area. Mitigation measures have been designed to ensure that direct effects of project activities are short term, and important recreation values are protected in the long term. ROS classes are expected to be changed 1 to 5 years after treatment, but following completion of vegetation treatments should display many of the characteristics described for each setting". On the Kaibab NF, "There would be short term and temporary changes in ROS classes as well as decreases in the scenic quality of trailside recreation settings due to restoration activities (see report for examples). Following completion of treatments, trailside settings are expected to naturalize quickly (within 1 to 3 years) and the scenic quality of the settings would be improved" (web-based DEIS, page 288). The impact to recreation settings from road actions are described on page 288 of the DEIS, "Decommissioning of existing and unauthorized roads would improve recreation settings over time and would improve ROS classes. Temporary road construction would result in short-term disturbance and temporary changes in ROS classes. New linear features would be added to recreation settings reducing the scenic quality for 3 to 10 years. There may be some increase in illegal motorized vehicle use of these roads until they are decommissioned. Once these roads have been decommissioned, they are usually not apparent to the casual user.

		Mitigation measures would be used to close off entrance and exit locations of these roads, as well as use of BMPs (see appendix C of the DEIS). Opening closed roads would have similar effects as reopening temporary roads; however, decommissioning would result in the roads revegetating and becoming natural appearing over time. Since these roads would not be reopened, in the long term the decommissioned roads would meet and improve ROS classes".
Hildreth, Stephanie	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this	Thank you for your comments. Please see our response to letter #19.

	document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Holasek, Dorothy	2nd half of comment received via postal mail (attachments) on 5/14/13--pages 47-82. The comment letter is attached, as well as the first 46 pages of the comment with attachments. A second comment letter will add in pages 47-82 of the comments. This letter and my letter dated April 6, 2012 (which I am resubmitting at this date) are my response to the Coconino 4FRI DEIS published in the Federal Register on March 29, 2013. I request that the USFS answer both letters. In my letter dated April 6, 2012, I established that 4FRI is located entirely within the Radiation Exposure Compensation Act (RECA) counties of northern Arizona. The DEIS failed to mention this fact. I also outlined the world literature that clearly shows that the burning of forest biomass, especially the forest litter and duff, resuspends and concentrates long-lived manmade and natural radionuclides held in the biomass and soils. Downwind populations are exposed through inhalation, immersion in contaminated air and deposition to soil and plants followed by ingestion by humans and their livestock. Enclosed are three maps: 1) the total CS-137 (half-life 30 years) from the Nevada Test Site fallout. 2) the total Sr-90 (half-life 28 years) from the Nevada Test Site fallout. 3) the total fallout in uCi/square meter that fell on the US between 1951 and 1970. Our northern Arizona forests received some of the highest amounts of fallout in the US. Ninety percent of wood smoke is 2.5 microns or smaller. It is so small that closed doors and windows cannot stop its entry. Smaller than some	(75-1) Please see our complete response in comment letter 74-1. (74-1) We have considered your comments since 2011 when you responded to scoping, see our response to your scoping comments (coded comment no. 25) in the June 12, 2012 Scoping Report. In response to your comments, we made prescribed fire emissions an issue that was addressed in the draft environmental impact statement (DEIS). Emissions were analyzed in the DEIS (DEIS, pp. 166-173). The Fire Ecology Report (for the DEIS) addresses emissions on page 25 (methodology), 76 to 92 (affected environment), 119-120, 159-161, 189-190, 221-222, 239-241 (environmental consequences). Page 25 of the report discloses the methodology used to evaluate emissions, “Smoke/emissions were evaluated both qualitatively and quantitatively by modeled emission quantities in pounds/acre for the most common stand condition under different treatment scenarios. Additionally, changes in those fuel components which produce the greatest percentages of emissions when they burn were modeled, and mapped. These include litter, duff, and CWD>3 inches. Canopy fuels were no modeled to allow for a more accurate comparison because, while canopy fuels can make up the bulk of the initial burst of emissions from a crown fire, they are not a significant contributor in prescribed fires. Emissions were modeled with the First Order Fire Effects Model (FOFEM) for a group of stands that represent one of the most common conditions on the landscape. These conditions have some of the highest emissions potential of all stands within the proposed treatment area.
Holasek, Dorothy	bacteria, these particles are able to penetrate into the deepest recesses of the lung and even into the bloodstream. Some of these	“ For the DEIS, the fire analysis (report) discussed radioactive emissions

particles remain in the lungs for extended periods. Others are carried to lymph nodes by scavenger cells (Eisenburg 1987, Shapiro 1990). Cesium-137's analog is potassium and it has an affinity for all the body's soft tissues. Strontium 90's analog is calcium and it has an affinity for bones and teeth. Plutonium 239 has no analog and it's affinity is for lungs, liver and bone lining cells. The latest epidemiological reviews of large scale chronic low dose exposures have uncovered some disturbing results. The "dose rate effectiveness factor" (dref) is a numbered value used to determine the harm caused by a specific dose. It assumes that a spread out dose is judged to be half as harmful as the same dose given all at once. This assumption was strongly challenged by the studies of Cardis 2005, Jacob 2009, Krestinina 2007 and Ozasa 2002. They found in nuclear workers and the exposed public that there was a higher incidence of cancer for protracted (spread out dose) exposures than found in atomic bomb data. It is postulated that the immune system has the ability to marshal a one-time antioxidant defense, but loses its protective effects from chronic exposure (the Petkau Effect).If this mechanism turns out to be valid, then chronic exposure to prescribed burns could be another unthinkable tragedy in the making. In addition to this threat to the general population, children are the most vulnerable because of the longer internal exposure time these radionuclides have to induce cancer in their lifetimes. One reason that genetic risks in the Beir VII estimates are low is that only those genetic changes compatible with embryonic development and viability will be recovered in live births. Beyond even the human suffering, the Department of Justice has paid out over $800,000,000 to date for claimants under RECA. Specifically Tommy Thompson, Attorney in Globe, Arizona and Laura Taylor, Attorney in Prescott, Arizona have successfully processed over $80 million and $50 million respectively for their clients. It is possible that this re-exposure to the original downwinders could increase the number of new claims under RECA.

associated with the Cerro Grande Fire on pp. 84-85. In the final report for the FEIS this discussion occurs on pp. 100-101. The analysis states, "LANL, the Department of Energy, and NMED monitored radionuclide concentrations in smoke from the Las Conchas fire that burned through the Los Alamos area in the summer of 2011 and reported no significant detection levelshttp://www.nmenv.state.nm.us/nmrcb/documents/LasConchasFireAirMonitoring.html).A study that included Lockett Meadow, within the project area, found levels of radioactive materials in the soil were no different than background levels, and would provide no added human health risk (Ketterer et al 2004, Graham 2012a). Communication with the EPA (Gerdes 2012, Graham 2012a), and studies that addressed these emissions (Schollnberger et al. 2002) indicate that radioactive isotopes and other undesirable chemicals are present in wildfire emissions. Some are naturally occurring chemicals that have always been present at some level in wildfire smoke and some have resulted from the weapons testing that occurred in the mid-20th century. At the level of exposure the public is subjected to, radionuclides do not pose as great a risk as wildfire. Radioactive material that may be carried in the smoke plume carries a risk of human health concerns of less than 1 chance in 10 million(NMED 2002, Graham 2012a) and the greatest health risk is from breathing high concentrations of particulate matter in the smoke". In response to concerns submitted to the DEIS related to mercury, the fire ecology report was updated to include a mercury analysis. Issue 1 in chapter 1 of the FEIS, was revised to include mercury as an emission of concern. In the FEIS, both fire ecology and water quality analyses include a discussion on mercury. Also see response to letter #6, comment 2.The following analysis was added to the FEIS Fire Ecology/Air Quality specialist report: “Mercury is present at some background level around the world, and is likely to be present in emissions from wildland fires (Selin 2009, Obrist et al. 2008, Biswas et al. 2007, Wiedinmyer and Friedli 2007, Friedli et al. 2003). However, there is insufficient science to support conclusions about specific effects from the 4FRI. General conclusions may be possible, but no valid effects could be presented. Even if we did have the means of providing an estimate of mercury emissions, we would still not know the effects. We were not able to find any information on levels of mercury in the

biomass in or near the project area, or in emissions from wildfires or prescribed fires in, or close to the project area. The amount and impact of mercury that is in emissions from a specific fire depends on how much mercury is present in the biomass that is burning; how intensely the fire burns, moisture content of the fuel, how complete the burn is, and wind for the duration of the time there are emissions in the air. There is little question that there would be more mercury in emissions from high intensity wildfires than from the low intensity fires that would typify the prescribed fires proposed by the 4FRI (Obrist et al. 2008, Biswas et al. 2007, Friedli et al.2003). Mercury is not a Criteria Pollutant, that is, it is not one of the six substances for which there are National Ambient Air Quality Standards, because it is not considered an 'ambient' substance. Mercury is regulated as a "point source", meaning emissions are regulated by the specific sources which discharge pollutants into the air from a specific and clearly discernable discharge point, such as a power plant. When a wildfire burns through an area, it is likely to release more mercury than any prescribed fire would. Additionally, prescribed fires help reduce the intensity of ensuing wildlfire.After reviewing available literature (Selin 2009, Obrist et al. 2008, Biswas et al. 2007, Wiedinmyer and Friedli 2007, Friedli et al. 2003) and consulting the EPA (Jason Gerdes, personal communication; Richard Graham, personal communication), the USFS's Washington Office Air Quality lead (Peter Lahn, personal communication), and the USFS's liaison to the Air Quality Division of the ADEQ (Ron Sherren), the potential for mercury emissions as a result of prescribed fire is considered to be incomplete and unavailable information relevant to determining reasonably foreseeable adverse impacts to the human environment as directed by CEQ Sec. 1502.22 (b) 1.In response to comments, the DEIS included an alternative that would have eliminated the use of prescribed fire and utilize other methods (DEIS, Eliminate the Use of Prescribed Fire, pp. 54-56). The alternative was considered but eliminated from detailed study because it would not meet various elements of the purpose and need (see DEIS, pp. 54-56). It would be possible to use mechanical treatments to move biomass offsite and reduce some surface fuels that would have been burned and produced smoke. However, mechanical treatment would not replace the role fire has in improving vegetation composition and diversity on: (1) 59,391

acres of existing grasslands, (2) over 56,000 acres of ponderosa pine with a savanna or grassland reference condition, (3) grassland inclusions within 308,000 acres of ponderosa pine forested areas, (4) 5,261 acres of pine-sage, (5) 1,471 acres of aspen, and (6) thousands of acres where Gambel oak exists within the pine forest. Additional rationale on why the alternative was considered but eliminated is located in the DEIS at page 56.In response to the concern over emissions from prescribed fire, Alternative D was developed. Alternative D decreases the acres that would receive prescribed fire by over 60 percent (actually 69 percent) when compared to alternative B (proposed action). The DEIS at page v only states prescribed fire would be reduced by 30 percent. This is incorrect and has been corrected in the FEIS. Prescribed fire (pile, broadcast, and jackpot burning) would occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. Coordination with ADEQ would take place through the Kaibab and Coconino NF Zone Dispatch Center and the prescribed fire Burn Boss (web-based DEIS, FE2, page 568). Emission reduction techniques (ERTs) that are recommended by Arizona ADEQ would be utilized when possible to minimize impacts to sensitive receptors (including communities) of burn unit(s) (DEIS, FE3, page 568). The DEIS describes mitigation and design features that would be used to reduce emissions from prescribed fire including:(1) Reducing the emissions produced for a given area treated, (2) Redistributing/ diluting the emissions through meteorological scheduling and by coordinating with other burners in the airshed. Dilution involves controlling the rate of emissions or scheduling for dispersion to assure tolerable concentrations of smoke in designated areas, and (3) Avoidance uses meteorological conditions when scheduling burning in order to avoid incursions of wildland fire smoke into smoke sensitive areas (DEIS, FE9, page 570)The following ERTs would be used when practicable to minimize impacts to sensitive receptors: pre-burn fuel removal, mechanical processing, increased burning frequency, aerial/mass ignition, high moisture in large fuels, rapid mop up, air curtain incinerators, burn before greenup, backing fire, maintain fire line intensity, underburn before litterfall, isolating fuels, concentrating fuels, mosaic/jackpot burning, moist litter and duff, burn before large activity fuels cure, and utilize piles (DEIS, FE8, page 570). In addition to prescribed fire, the 4FRI is proposing over 388,000

		acres of mechanical treatments (DEIS pp. 40-41). On the majority of these acres, there would be little slash available for burning which means reduced emissions. The DEIS (DEIS pp. 166-173) and the FEIS (chapter 3) addresses and discloses impacts from prescribed fire as required by the Clean Air Act which establishes National Ambient Air Quality Standards (NAAQS) for six principal pollutants that pose health hazards: carbon monoxide (CO), lead, nitrogen dioxide, particulate matter less than 10 microns in size (PM10), particulate matter less than 2.5 microns in size (PM2.5), ozone, and sulfur dioxide. The DEIS (DEIS, p. 169) addresses regulatory requirements; “Prescribed fire is implemented only with approved site specific burn plans and with smoke management mitigation and approvals. All burning is conducted according to ADEQ standards and regulations. These standards include the legal limits to smoke emissions from prescribed burns as imposed by Federal and State law. The ADEQ enforces these laws by regulating the acres that are treated based on expected air impacts. These regulations ensure that effects from all burning meet Clean Air Act requirements. Prescribed fires are initiated under conditions that allow managers to meet both control objectives (fire behavior) and resource objectives (fire effects, including air quality impacts)”. The information disclosed in the environmental consequences of the DEIS and FEIS provide the Responsible Officials and the public with sufficient and relevant information to evaluate the potential adverse effects to the human environment from prescribed fire per CEQ Sec. 15022.22 (b) 3. The disclosure of impacts related to potential emissions from prescribed fire is consistent with CEQ Sec.1502.22 (b) 4.
Holasek, Dorothy	The DEIS cites Schallenberg 2002. Schallenberg was modeled for naturally occurring radionuclides deposited in the lungs of humans while inside their homes and with the health status of physically fit firefighters. In email communications cited in the DEIS, EPA Richard Graham, Shelly Rosenbaum and Jason Gerdes . .. "but we spend 90% of our day indoors. The indoor environment is the human environment. Learn how to protect it at our website." These three urban employees may spend 90% of their time indoors, but the citizens of northern Arizona live in rural counties. Our children wait for school buses on rural highways, our neighbors tend cattle, horses and fowl, grow their own food and we all open our windows. Imagine	(74-2) See 74-1 for the complete response.

the perfect day filled with sunshine, clean air and little wind, a day to spend watching first graders on a soccer field. It is also the perfect day to conduct prescribed burns in the four forests upwind to you. The DEIS refers to air samples done during the Cerro Grande and Las Conchas fires in New Mexico. Northern Arizona forests are 300 miles closer to the Nevada test site. The DEIS also refers repeatedly to "Los Alamos Nuclear Labs (LANL) derived chemicals and radioactive materials." The monitoring of the Cerro Grande Fire, a fire caused by an out of control prescribed burn, received harsh criticism for not stationing air samplers at key locations of heavy smoke such as Taos and the Rio Grande Valley. In addition, the company hired to do the analysis and calculate the risk to downwind populations gave this disclaimer, "While the modeling we developed for PM 10 data is quite reliable, the estimates of the quantities of materials available for release to the air, the rate at which these materials were released to the air and the risk associated with short-term exposure to some chemicals are less certain." LANL stated that "ambient concentrations are normally calculated on a quarterly (3 month) basis. Because samples from 6-7 week periods are combined together to increase releases of these radionuclides, isotopic analysis have been on much shorter term samples (2 weeks or less)", some 3 days. "Since the air volumes sampled and the mass of material being collected during these shorter periods are much lower, we cannot measure concentrations as sensitively or as precisely as we can with large samples taken over large periods of time." Therefore, the Cerro Grande and the Las Conchas studies suffered from the sampling rule: Less time spent sampling, the greater the uncertainty. It is important to note that the "one chance in 10 million" statement in the DEIS was originally attributed to LANL derived chemicals and radioactive materials from the Cerro Grande Fire and is based on less than a week's exposure, whereas 4FRI prescribed burning would be a chronic 20 year public health experiment. In my 04-06-12 1etter, I cited a 2002 study that found Cesium 137 "in ash concentrations were up to 40 times higher than concentrates in pre-fire soils". The DEIS refers to a study that included Lockett Meadow and soil levels of plutonium. The amount of plutonium ratios to Cesium 137 and Strontium 90 in individual tests is still classified after 60 years.

Holasek, Dorothy	Therefore, no certain extrapolation can be made from this study as to the levels of Cesium 137 or Strontium 90 in our northern Arizona forests. In addition, thyroid cancer research continues to identify hotspots of fallout related clusters, supporting the evidence that fallout did not evenly precipitate to all areas within the same county. The DEIS also refers to Chernobyl papers that outline the choice as follows: Yes, their forests are contaminated, therefore, prescribed burns are a better alternative to crown fires. According to the USFS (Lata, 2012): "Wildland fires can cause adverse health effects and/or become a nuisance, but are fundamental to the disturbance ecology associated with healthy ecosystems in the project area." . . . "Studies of human populations exposed to high concentration of particles (sometimes in the presence of S02) and laboratory studies of animals and humans, indicate there is a potential for detrimental effects on human health. These include effects on respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogenesis, and premature death. The major subgroups of the population that appear to be most sensitive to the effect of particulate matter includes individuals with chronic obstructive pulmonary or cardiovascular diseases of influenza, asthmatics, the elderly and children." ... (Lata, 2012). "At the level of exposures the public is subjected to radionuclides do not pose as great a risk as wildfires." ... "So in this context, smoke and visibility impairment from wildland fire that closely mimics what would occur naturally may generally be viewed as acceptable." (Lata, 2012). It would appear that what the DEIS is saying is as follows: Yes, prescribed burn smoke will likely harm and even shorten the lives of downwind populations, but it is less a threat than burning up in wildfire and it meets our program goals for forest health because it is nature's way of dealing with too many trees. My answer to this line of reasoning is: Nature's way of dealing with situations is not always merciful to human beings. A case in point, cholera is nature's way of dealing with too many human beings. The human body doesn't make a distinction between having a shortened lifespan from prescribed burn smoke or from cholera. More importantly, is the public adequately aware that	(74-3) See comment 74-1 for the complete response.

Holasek, Dorothy	prescribed burn smoke can shorten their lives and that the USFS predicts that we will continue to have catastrophic wildfires because of the severity of the Southwest climatology and fuel buildup in our forests?14,15 The public may be under the mistaken impression that the prescribed burn program under 4FRI will eliminate or dramatically reduce catastrophic wildfires. It is my contention that the DEIS should have an alternative "E" that includes exponentially increased thinning, logging, chipping and managed grazing of goats for underbrush and saplings, followed by cattle which would more efficiently reduce the risk of catastrophic wildfires. This is especially true in an area in which our #1 export is WIND. Fire season is now at least 2-1/2 months longer than it was 30 years ago and fire behavior, driven by high winds and higher temperatures, is becoming even more extreme. This means we need to look at the bigger picture rather than cling to a species, the ponderosa pine, that is essentially on the way out because of prolonged drought, reduced snowpack, higher extended winter temperatures and increased beetle kill. I believe that the protection of any species, plant or animal, should not result in the cancer, disability or death of a human being, especially when we have alternatives available to us.	(74-4) See comment 74-1 for the complete response.
Holasek, Dorothy	In email communications between EPA Graham, Gerdes and Rosenblum, Graham states, "It's a 'so what query' . . . Yes, there is re-suspension, and the small dust particles may be carried quite some distance dependent upon the lofting, wind strength, etc., but ... SO WHAT. There are other more important consequences than the small intake, if there is any at all, from the inhalation of dust particles containing the radionuclides. Of course, if one's mind is already made up, no amount of technical information will be convincing . .. it is an emotional thing, not a technical/scientific point." Eighty percent of radionuclides dose from nuclear testing was from ingestion, 16% from external and 4% was from inhalation. We are rural counties engaged in growing our own produce and livestock outside. The ash from prescribed burns will fall on the foliage of our gardens and fields and the ash leachate will mingle with our soils. We, in turn, will consume these plants and livestock and their milk. These radionuclides are capable of bioaccumulating. Dr. Graham's query	(74-5) See comment 74-1 for the complete response.

Holasek, Dorothy	'so what' is exactly what my request of the Forest Service is all about. I am requesting that the F.S. conduct the necessary scientific tests to establish the amounts and kinds of radionuclides that will be released in the prescribed burn smoke and publish the methodology and results for peer review. Then, and only then, will the citizens of northern Arizona, including the downwinder families, finally have informed consent and be in the position to answer Dr. Graham's 'so what?'. Dr. John Gofman also believed that chronic low dose exposure is far more dangerous than we have assumed. Gofman, a doctor of nuclear and physical chemistry and a medical doctor who worked on the Manhattan Project, co-discovered uranium 232 and 233 and other radioactive isotopes and proved their fissionability, helped discover how to extract plutonium, led the team that discovered and characterized lypoproteins in the causation of heart disease, served as a professor emeritus of molecular and cell biology at the University of California Berkeley, served as Associate Director of Lawrence Livermore National Laboratory, was asked by the Atomic Energy Commission to undertake a series of long range studies on the potential danger that might arise from "peaceful uses of the atom", and wrote four scholarly books on radiation health effects. Dr. Gofman summed up this dilemma perfectly. "It is a violation of the most fundamental human rights to impose risks (deaths) upon individuals without their consent. Human rights should not be sacrificed to the pursuit of a healthy economy, affluence, progress, science, or any other goal. The whole "benefit versus risk" doctrine is a profound violation of human rights. Also see 4FRI content analysis for references and literature review.	(74-6) Thank you for your comment.
Honn, Marsha	Please find enclosed a packet of information that was previously submitted to the Coconino Forest Service at an earlier date. I am re-submitting this packet during the official DEIS period to ensure that it is part of the official record. I do not see any attempts by the forest service to address the extensive health issues that are included in this packet.	(11-1) Thank you for your comment. In response to scoping comments, emissions were analyzed in the DEIS (web-based DEIS, pp. 166-173). The Fire Ecology Report addresses emissions on page 25 (methodology), 76 to 92 (affected environment), 119-120, 159-161, 189-190, 221-222, 239-241 (environmental consequences). Page 25 of the report discloses the methodology used to evaluate emissions, “Smoke/emissions were evaluated both qualitatively and quantitatively by modeled emission quantities in pounds/acre for the most common stand condition under different treatment scenarios. Additionally, changes in those fuel components which produce the greatest percentages of emissions

Honn, Marsha	The current Coconino Forest DEIS only briefly refers to the issue of mercury As noted in my earlier packet the University Corporation for Atmospheric Research conducted a study with Hans Friedli and Larry Radke. They collected foliage and ground litter samples from seven forests across the continental United States. These samples were set alight at a U.S. Forest Service fires laboratory, where sensors detected large amounts of mercury. All samples contained mercury at levels ranging from 14 to 71 nanograms per gram of fuel. The samples released 94 to 99% of a1l the mercury they had stored. Mercury is dangerous when it ends up in waterways, where it can transform into methyl mercury and move up the food chain and become more concentrated. Ingested methyl mercury causes its greatest damage to unborn fetuses and newborns, including developmental defects, reduced IQ, mental retardation, learning disabilities, behavioral problems and chronic neurological diseases. Arizona lakes such as Roosevelt, Tonto Creek, Soldier Lake and Upper and Lower Lake Mary already contain mercury warnings that fish are not safe for consumption. The mercury measurements cited by the Coconino DEIS, as far as I can discern were taken in 2002. That is 11 years ago. Since then, the Coconino forest service has extensively increased the number of prescribed burns it has conducted, not to mention uncontrolled wildfires that have occurred.Therefore,I am asking for new or updated readings of mercury levels in the Coconino	when they burn were modeled, and mapped. These include litter, duff, and CWD>3 inches. Canopy fuels were no modeled to allow for a more accurate comparison because, while canopy fuels can make up the bulk of the initial burst of emissions from a crown fire, they are not a significant contributor in prescribed fires. Emissions were modeled with the First Order Fire Effects Model (FOFEM) for a group of stands that represent one of the most common conditions on the landscape. These conditions have some of the highest emissions potential of all stands within the proposed treatment area. “In response to concerns submitted to the DEIS related to mercury, the fire ecology report was updated to include a mercury analysis. Issue 1 in chapter 1 of the FEIS, was revised to include mercury as an emission of concern. In the FEIS, both fire ecology and water quality analyses include a discussion on mercury. Also see response to letter #6, comment 2. (11-2) After reviewing available literature (Selin 2009, Obrist et al. 2008, Biswas et al. 2007, Wiedinmyer and Friedli 2007, Friedli et al. 2003) and consulting the EPA (Jason Gerdes, personal communication; Richard Graham, personal communication), the USFS’s Washington Office Air Quality lead (Peter Lahn, personal communication), and the USFS’s liaison to the Air Quality Division of the ADEQ (Ron Sherren), the potential for mercury emissions as a result of prescribed fire is considered to be incomplete and unavailable information relevant to determining reasonably foreseeable adverse impacts to the human environment as directed by CEQ Sec. 1502.22 (b) 1.The following analysis was added to the FEIS Fire Ecology/ Air Quality specialist report: “Mercury is present at some background level around the world, and is likely to be present in emissions from wildland fires (Selin 2009, Obrist et al. 2008, Biswas et al. 2007, Wiedinmyer and Friedli 2007, Friedli et al. 2003). However, there is insufficient science to support conclusions about specific effects from the 4FRI. General conclusions may be possible, but no valid effects could be presented. Even if we did have the means of providing an estimate of mercury emissions, we would still not know the effects. We were not able to find any information on levels of mercury in the biomass in or near the project area, or in emissions from wildfires or prescribed fires in, or close to the project area. The amount and impact of mercury that is in emissions from a specific fire depends on how much mercury is present in the

Honn, Marsha	lakes, streams and soil.Also, I am asking for measurements to be taken during each prescribed burn so the public may be aware of the amounts of mercury they are being exposed to with every bum. In addition to this issue I do not see any measurements of liquefied petroleum products in terms of either soil or air contamination. The health hazards of breathing combusted petroleum products is regulated by the Arizona Department of Environmental Quality's Open Burning Permit (A.A.C.R18-2-602A,O). These permits for the public do NOT allow for starting fires that cause black smoke. Items listed include petroleum products such as gasoline or diesel fueL. So the department of Arizona air quality feels even these small amounts of accelerants used by the public are a health risk, yet the forest service is pouring large quantities of diesel or jet fuel (kerosene, naphthalene, ethyl benezene and trim ethyl benzene) on the forest floor or wood piles and igniting them, causing massive black smoke (see photos) that blankets entire communities.It is unfortunate that the forest service for some reason is exempt from these standards. I find this makes quite a mockery of the ADEQ agency. And last but not least is the release of fine particulate matter.The forest service acknowledges that fine particulate matter will be released from the prescribed bums and even acknowledges the extensive health hazards involved in breathing fine particulate matter. These particles can go deep into the lungs and pass into the blood stream attacking vital organs. An article by the American Thoracic Society found with an increase of 10 micrograms per cubic meter of particles over two years, the risk of death was increased by 32% for diabetes, 28% for people with COPD, asthma and pneumonia, and 27% in people with congestive heart failure and 22% for people with inflammatory diseases.Particulates with the smallest diameter can also cross nasal membranes into the brain, where studies suggests that they trigger inflammatory responses and oxidative stress that leads to cell death. The forest service's plan to protect the public from smoke is to tell them to go inside during the prescribed burning.The smoke from a prescribed burn can last for days and sometimes weeks. I am sure they are aware that many studies show even the most air tight house cannot keep fine particulate smoke out of the home.	biomass that is burning; how intensely the fire burns, moisture content of the fuel, how complete the burn is, and wind for the duration of the time there are emissions in the air. There is little question that there would be more mercury in emissions from high intensity wildfires than from the low intensity fires that would typify the prescribed fires proposed by the 4FRI (Obrist et al. 2008, Biswas et al. 2007, Friedli et al. 2003). Mercury is not a Criteria Pollutant, that is, it is not one of the six substances for which there are National Ambient Air Quality Standards, because it is not considered an 'ambient' substance. Mercury is regulated as a "point source", meaning emissions are regulated by the specific sources which discharge pollutants into the air from a specific and clearly discernable discharge point, such as a power plant. When a wildfire burns through an area, it is likely to release more mercury than any prescribed fire would. Additionally, prescribed fires help reduce the intensity of ensuing wildfire. Regarding petroleum fuels, prescribed fire would be implemented in full compliance with regulations and policies set by the ADEQ. Jet fuel is not a fuel utilized to ignite fuels in the implementation of prescribed fires. Also see response to letter #6. (11-3) Please see previous response (11-2) and response to letter #6.

Honn, Marsha	each forest service area in Northern Airzona burns at the rate the Coconino forest service plans to, then the average citizen will be spending the majority of their time locked inside their homes. I am also specifically asking that the smoke monitor which was taken from the Snowflake, Arizona area and moved to Show Low be returned or replaced by ADEQ. In the interest of public health, I do not think the Coconino forest should be allowed to conduct these extensive prescribed burn plans, especially in light of the fact that they have said they will be burning at maximum levels for the next 20 years. I feel these prescribed burns present a major health risk to the public and therefore the public has a right to protection through the form of more extensive measurements of mercury, particulate matter and petroleum based accelerants. I see nowhere in the plan to inform the public that they are going to be exposed to these hazards each time they perform a prescribed burn. We put warning labels on packages of cigarettes, yet people who don't smoke aren't even afforded the opportunity to breathe clean air in their own homes.	(11-4) Page 86 of the Fire Ecology and Air Quality Report states, "Permits are issued by the Arizona Department of Environmental Quality (ADEQ), who help to monitor/manage potential smoke impacts by tracking what is burning at any given time. The ADEQ currently has air quality monitors in Camp Verde, Sedona, Flagstaff, Prescott, Show Low, and Springerville, with additional monitors that can be set up if when there are specific concerns. Outputs of these monitors are available online at: http://www. phoenixvis.net/PPMmain.aspx. Please direct your request for an air quality monitor to the agency with jurisdiction, ADEQ. While we can work with ADEQ and recommend they place a monitor in Snowflake, this request is outside the scope of our jurisdiction.
Honn, Marsha	There are many safe alternatives to prescribed burns. These include logging for fire breaks, chipping, thinning, goat and cattle grazing. With the increasingly dryer, windy southwest climate, air tankers need to be positioned at key locations in our forests to immediately extinguish wildfires. Implementation of these techniques will help provide cleaner air and also reduce carbon contribution to global warming.Montana seems to have the right idea of how to manage forests. A December issue of Montana Outdoors highlights an article by Tom Dickson (see attached) entitled, "Please Do Disturb." He notes that mechanical forest management is frequently a more cost effective and safer option.It also shows how controlled logging could benefit the forest services economy.	(11-5) The DEIS included an alternative that would have eliminated the use of prescribed fire and utilizes other methods (web-based DEIS, Eliminate the Use of Prescribed Fire, p. 54). The alternative was considered but eliminated from detailed study because it would not meet various elements of the purpose and need (see web-based DEIS, page 54-56). It would be possible to use mechanical treatments to move biomass offsite and reduce some surface fuels that would have been burned and produced smoke. However, mechanical treatment would not replace the role fire has in improving vegetation composition and diversity on: (1) 59,391 acres of existing grasslands, (2) over 56,000 acres of ponderosa pine with a savanna or grassland reference condition, (3) grassland inclusions within 308,000 acres of ponderosa pine forested areas, (4) 5,261 acres of pine-sage, (5) 1,471 acres of aspen, and (6) thousands of acres where Gambel oak exists within the pine forest. Additional rationale on why the alternative was considered but eliminated is located in the DEIS at page 56. In response to the concern over emissions from prescribed fire, Alternative D was developed. Alternative D decreases the acres that would receive prescribed fire by over 60 percent (actually 69 percent) when compared to alternative B (proposed action). The DEIS at page v only states

prescribed fire would be reduced by 30 percent. This is incorrect and has been corrected in the FEIS. The DEIS describes mitigation and design features that would be used to reduce emissions from prescribed fire including:(1) Reducing the emissions produced for a given area treated, (2) Redistributing/ diluting the emissions through meteorological scheduling and by coordinating with other burners in the airshed. Dilution involves controlling the rate of emissions or scheduling for dispersion to assure tolerable concentrations of smoke in designated areas, and (3) Avoidance uses meteorological conditions when scheduling burning in order to avoid incursions of wildland fire smoke into smoke sensitive areas (DEIS, FE9, page 570). Prescribed fire (pile, broadcast, and jackpot burning) would occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. Coordination with ADEQ would take place through the Kaibab and Coconino NF Zone Dispatch Center and the prescribed fire Burn Boss (web-based DEIS, FE2, page 568). Emission reduction techniques (ERTs) that are recommended by Arizona ADEQ would be utilized when possible to minimize impacts to sensitive receptors (including communities) of burn unit(s) (web-based DEIS, FE3, page 568). The following ERTs would be used when practicable to minimize impacts to sensitive receptors: pre-burn fuel removal, mechanical processing, increased burning frequency, aerial/mass ignition, high moisture in large fuels, rapid mop up, air curtain incinerators, burn before greenup, backing fire, maintain fire line intensity, underburn before litterfall, isolating fuels, concentrating fuels, mosaic/jackpot burning, moist litter and duff, burn before large activity fuels cure, and utilize piles (web-based DEIS, FE8, page 569). In addition to prescribed fire, the 4FRI is proposing over 388,000 acres of mechanical treatments (web-based DEIS page 40). On the majority of these acres, there would be little slash available for burning which means reduced emissions. The DEIS (pp. 166-173) and the FEIS (chapter 3) addresses and discloses impacts from prescribed fire as required by the Clean Air Act which establishes National Ambient Air Quality Standards (NAAQS) for six principal pollutants that pose health hazards: carbon monoxide (CO), lead, nitrogen dioxide, particulate matter less than 10 microns in size (PM10), particulate matter less than 2.5 microns in size (PM2.5), ozone, and sulfur dioxide. The DEIS at page 169 addresses regulatory requirements,

		"Prescribed fire is implemented only with approved site specific burn plans and with smoke management mitigation and approvals. All burning is conducted according to ADEQ standards and regulations. These standards include the legal limits to smoke emissions from prescribed burns as imposed by Federal and State law. The ADEQ enforces these laws by regulating the acres that are treated based on expected air impacts. These regulations ensure that effects from all burning meet Clean Air Act requirements. Prescribed fires are initiated under conditions that allow managers to meet both control objectives (fire behavior) and resource objectives (fire effects, including air quality impacts)". The information disclosed in the environmental consequences of the DEIS and FEIS provide the Responsible Officials and the public with sufficient and relevant information to evaluate the potential adverse effects to the human environment from prescribed fire per CEQ Sec. 15022.22 (b) 3. The disclosure of impacts related to potential emissions from prescribed fire is consistent with CEQ Sec. 1502.22 (b) 4. Also see the response to letter #6.
Honn, Marsha	I do appreciate the role the forest service plays in protecting our homes and lives. I hope they will see that in order to protect our lives they need to use the safest forest management practices and abandon this plan of constant control burns.Especially since there are so many safe alternatives. I hope the forest service takes these requests seriously and will put public health first on their agenda. After all the forest service employees and their families are equally effected by these serious health hazards.	(11-6) Please see the response to comment 11-1.
HONN, MELINDA	My husband and I become so ill on forest burning days that we can't function. It is criminal to do all the burning when other resources are available. For 50 years the forest was managed and there were no forest fires. Controlled logging and other forest management is available. The most hideous contradiction is that President Obama claims that carbon is changing our climate and wants to charge corporations a carbon tax. Then he gives the forest services millions to burn and create carbon. The smoke contains carcinogens and also causes much respiratory distress for those of us and even in surrounding states with little regard for the health of Arizona citizens. Of special concern is the high level of radiation contained in the trees which is released during these burns.	(126-1) Thank you for your comment. Please see our responses to prescribed fire and emissions in letter 6, 11 and 74.

Hughes, Billie	Please find attached to this message and pasted below a letter from five conservation organizations commenting on the Draft Environmental Impact Statement for activities connected to the Four Forest Restoration Initiative in the Coconino and Kaibab National Forests. All attachments described in the comment letter are embedded in the PDF document.	(Letter 198) Please see our response to letter 196.
Hunt, Scott , Payne, Jerry	The analysis of 988,674 acres with the potential treatment of 593,211 acres has the capability to make a significant difference in catastrophic wildfire loss, forest and watershed restoration, and rural economic development. The Draft Environmental Impact Statement (DEIS) document is the culmination of years of work begun in the Governor's Forest Health Council and continued in the Four Forest Restoration Initiative (4FRI) Collaborative. This 4FRI project is an example of the collaborative and your staff working together to air the issues, followed by a negotiated zone of agreement, and ending with this huge volume of work. The effort and commitment of all the participants is impressive. We are very pleased to have been included and a partner in this process.	(166-1) Thank you for all the assistance and time as we worked through the planning process.
Hunt, Scott , Payne, Jerry	State Forestry is a charter member of the 4FRI Collaborative and was fully involved with the development of their submitted comments. We firmly believe that time is of the essence and that what can be done to expedite the NEPA process and begin treatments is of utmost importance. The more time that passes before these acres are treated and the fire risk reduced, the more chance there is for catastrophic wildfire with the associated loss of more homes, loss of habitat, and extreme impacts to our watersheds. We appreciate the opportunity to submit comments from our Agency. We wish to thank the USFS 4FRI team for all of their effort and cooperation in the development of the historic scale DEIS.	(166-2) We entirely agree. Thank you for your comments.
Hunt, Scott , Payne, Jerry	Issue 1: Economic Consideration: While the DEIS does contain a Socioeconomic Resource Report, we believe that not enough attention was paid to the real potential of income generation. The analysis recognizes a $100 million offset of treatment costs, but the value of the material removed seems overlooked. This is highlighted in a footnote on page 24 of the Socioeconomic Resource Report, which states that the "Chediski fire burned approximately 1 billion	(166-3) Thank you for your comments. The economic analysis describes the estimated effects to local employment and income (DEIS pg. 293; socioeconomic specialist report, pp. 18-20). The cost-benefit analysis describes the cost saving to government (DEIS pp. 292-93; socioeconomic specialist report, pp. 20-24). An analysis of private costs and benefits would require information on costs to the firm of removing forest products, which not available. Therefore, the analysis describes

	board feet of timber, valued at more than $300 million (Morton et al2003)." While the details of these figures are not given in the DEIS, it is assumed that these figures represent values beyond stumpage. This project is anticipated to produce "360,000 CCF oftimber...on an average annual basis throughout the 10-year treatment period," DEIS page 280. This is approximately 1.79 billion board feet of timber, that using the same numbers in the DEIS would generate approximately $537 million. Even though the values in the study may be outdated, we believe the scale and term of this 4FRI project dictate a more thorough economic analysis of the potential timber revenue projections, not just offsetting costs of the federal government. Restoration and hazardous fuel reduction are commendable goals that could easily be met while purposefully generating revenue to benefit the forests and citizens of the country. Projects of this size, with equal consideration given to economic benefit have the potential of revitalizing the payments in lieu of taxes fund, and could make much more revenue available for local schools and counties	only avoided cost to government from private forest restoration. However, in response to comments on the DEIS the following language has been added to the socioeconomic portion of the EIS, "The costs of a single large fire may greatly exceed annual wildfire expenditures listed above. The Forest Service, for instance, spent approximately $14.4 million responding to the 2010 Schultz Fire (Combrink et al 2013). Furthermore, the total cost of the Schultz Fire – including decreased property values, loss of life, cleanup, evacuation, and habitat destruction – is estimated to be between $133 million and $147 million (Combrink et al 2013). Therefore, economic benefits of 4FRI described here should be viewed as lower-bound estimates." In addition, we have added more information related to the costs of using a stewardship contract, "Over the 10-year treatment period, the selected alternative will save between $156 and $23 million of cost to the taxpayer as a result of using stewardship contracts (see socioeconomic report, Summary of Effects, "Avoided Treatment Costs" section).
Hunt, Scott , Payne, Jerry	Issue 2: Prescribed Fire: One of the goals of this project is the restoration of natural fue regimes to fire-dependent landscapes and vegetation types. This is a goal that Arizona State Forestry supports. However, it must be done in a well thought out manner and cannot be done when and where conditions do not warrant. The DEIS, page 40 states: "Two prescribed fires would be conducted on all acres proposed for treatment over the 10-year period." With this hard and fast proclamation, there is a concern that natural resource objectives, public safety, public health, and protection of private property could be compromised. We request that this statement be replaced with one that emphasizes an accelerated prescribed fire program with a goal of burning each proposed acre twice over a ten year period.	(166-4) Thank you for your recommendations. We worked to clarify statements in the alternatives related to prescribed fire. In response to comments on the DEIS, the wording (in the action alternatives) has been updated to read, “On average, 40,000 to 60,000 acres of prescribed fire would be implemented annually across the national forests (within the treatment area). Up to two prescribed fire would be conducted on all acres proposed for treatment over the 10-year period" (FEIS, chapter 2, "Alternatives Considered in Detail" section).
Hunt, Scott , Payne, Jerry	Issue 3: Large Tree Retention Strategy: State Forestry believes that the essence of stakeholder-produced Old Growth Protection and Large Tree Retention Strategy are included in the DEIS's Old Tree and Modified Large Tree Implementation Plan. The explanations for this decision given on Table 15, pages 60-61 DEIS show that the USFS incorporated the substance and intent of the stakeholder documents. USFS land managers need the flexibility provided in this	(166-5) Thank you for your comments. We appreciate State Forestry recognizing we included a large and old tree implementation plan derived from the stakeholder's document.

Hunt, Scott , Payne, Jerry	strategy to make appropriate on-the-ground decisions across this diverse landscape. Issue 4: Impact to Local Roads and Highways:The DEIS, page 302, states "The 4FRI project area encompasses the Arizona communities of Flagstaff, Mountainaire, Munds Park, Kachina Village, Mormon Lake, Doney Park, Parks, Williams, and Tusayan. Major access routes include Interstates 40 and 17, U.S. Highways 89,180, and 66, State Route 64, County Road 73, and Lake Mary Road (Forest Highway 3)." This project is anticipated to significantly increase logging truck traffic on all these major access routes. A preliminary analysis done by Arizona State Forestry, Governor's Forest Health Council, Eastern Arizona Counties, and others, found that implementing 4FRI will result in approximately a $2 million increase in road maintenance for State, County, and municipal roads.The Transportation Specialist's Report does not include any analysis of roads not located on the National Forests. We would like to request a more thorough analysis of the impact and cumulative impacts to the local infrastructure be completed and included in the Final EIS and Record of Decision. We offer to help with this analysis and to work with other State and local agencies.	(166-6) Thank you for your comments. The DEIS and (DEIS) transportation specialist report currently does not disclose the effects to roads that have are not located on National Forests because we do not have jurisdiction on these roads. The unit of measure for the analysis is displayed in the DEIS at page 318 and within the transportation specialist report on page 15, which does not include non-Forest Service roads. For the FEIS we will include a discussion in the cumulative effects section outlining roads in other jurisdictions.
Hunt, Scott , Payne, Jerry	Issue 5: Water Yield: In the DEIS pages 38-39 and 47, water yield is considered, but only as a potential research item. There is not any emphasis on actually designing treatments to capture snowfall and increase water flow. The effects analysis recognized that water yield from these forest "is likely reduced from historic conditions due to forest ingrowth and dense stand conditions" DEIS, page 102. On this same page, the analysis of alternatives recognizes "Water yield would be expected to increase only slightly in areas where vegetation treatments remove 25 to 50 percent of the overall tree canopy cover within a given watershed." There is not any focus on this issue nor is there text stating that this is an issue of concern. There is no recognition that within the present alternatives, implementation could be designed with the intent of increasing snowfall retention and water yield.With Arizona's continued drought and significant water demands, this project should do what it can and where it can to consciously increase water yield. We request that the Forest Service recognize this is an important issue that deserves	(166-7) Thank you for your comments. Alternative C (in the DEIS) includes a paired watershed study that would study the effects of forest treatments on water balance including snowpack water retention and water yield. Any increases in water yield are a secondary benefit of proposed forest restoration. The water quality analysis at page 36 (and table 6 on page 39) of the DEIS states (summary) that water yield would be transitory without maintenance treatments. Page 45 (paragraph 3 and 4) of the water quality specialist report evaluates the cumulative differences on water yield between no action (alternative A) and Alternative C. Pages 46 and 47 discuss potential change to water yield associated with prescribed fire. The FEIS will evaluate water yield differences in the FEIS.

	more consideration. In many places, where there are no substantial conflicts with other resource needs, the FS should consider increasing the width of openings to 1.5 to 2 times the tree heights with the intent of increasing snow pack; with the openings generally situated perpendicular to the slope. This should especially be considered on north facing slopes that receive less direct sunlight, thus allowing the snow pack to last longer and get deeper and produce more ground water. The Forest Service should work with experts in this field to design and implement other aspects of treatments that will increase water yield. Increased snow pack will mean more soil moisture for the trees and shrubs, benefiting wildlife, and should lead to increased water yield. In Arizona particularly, this should be something that the National Forests strive for, especially where these treatment designs would work well with the other resources of concern.	
Hunt, Scott , Payne, Jerry	Issue 6: Cumulative Effects:Two employees of State Forestry met with the Forest Service 4FRI development team to examine the extent of site specific analysis and cumulative effects analysis that was done for this project. Given this, we do have concerns with the cumulative effects analysis. Trying to assess and determine if the cumulative effects analysis was thorough was extremely difficult. The DEIS contains Appendix F - Cumulative Effects, but this has only a portion of the actual cumuiative effects in it. Much of the cumulative effects are presented in Chapter 3 - Affected Environnment, and most of it is "incorporated by reference" in the specialist reports. In all these places, the cumulative effects were presented in a wide variety of formats. The degree of analysis also varied widely; some analysis was in-depth, gave the measures, and the conclusions were well supported; while other analysis was brief and appears to only be a statement of professional opinion. This could be satisfactory if the measures and the rationale for the professional opinion were also included. We request that a hard look be given to the cumulative effects analysis; that it be organized and thoroughly indexed. The index should link Chapter 3, Appendix F, and the Specialist reports. We also request that a common format be used, and the measures be clearly presented.We make this request because cumulative effects as presented may present a very strong vulnerability of the	(166-8) Thank you for your comment. In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. We considered requests to have all cumulative effects analyses presented in a similar format for all resources. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political"(FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose.

	DEIS.	
Hunt, Scott , Payne, Jerry	Issue 7: Missing Information: In Chapter 3, Affected Environment, page 311, and in Appendix F the Cumulative Effects, page 675, it states "A summary from the range specialist report is presented here and the complete report is incorporated by reference (Hannemann 2013)." On the Forest Service web site, http://www.fs.usda.gov/detail/4fri/home/?cid=STELPRDB5292025 the referred to range specialist report is not listed. We request that this be made available for review.	(166-9) We agree the report was not posted with the other specialist reports.
Hunt, Scott , Payne, Jerry	Summary: The agency is supportive of the preferred alternative and associated Forest Plan amendments. State Forestry commends this historic landscape project that offers the potential to make substantial progress in protection of our forested communities, restoring our forests and watersheds, and providing much needed economic opportunities in our forest dependent communities. The comments submitted by Arizona State Forestry are done so with the intent to strengthen and help speed the implantation of this project.	(166-10) Thank you for your time and attention.
Inch, Terry	I am writing to appeal for the reduction of the planned burns scheduled for the next ten years in the Verde Valley of Arizona. My family moved here from Los Angeles to get out of the toxic air and now the Valley is resembling Los Angeles in that we have serious irritation and inflammation of our respiratory systems (obviously previously compromised), and I have had to go on several series of antibiotics for bronchitis in the last two years. Please reduce your planned burns as the air quality in our beautiful valley has been rapidly reduced to dangerous for humans.	(119-1) Thank you for your comment. In response to comments, the DEIS included an alternative that would have eliminated the use of prescribed fire and utilize other methods (web-based DEIS, Eliminate the Use of Prescribed Fire, p. 54). The alternative was considered but eliminated from detailed study because it would not meet various elements of the purpose and need (see web-based DEIS, page 54-56). It would be possible to use mechanical treatments to move biomass offsite and reduce some surface fuels that would have been burned and produced smoke. However, mechanical treatment would not replace the role fire has in improving vegetation composition and diversity on: (1) 59,391 acres of existing grasslands, (2) over 56,000 acres of ponderosa pine with a savanna or grassland reference condition, (3) grassland inclusions within 308,000 acres of ponderosa pine forested areas, (4) 5,261 acres of pine-sage, (5) 1,471 acres of aspen, and (6) thousands of acres where Gambel oak exists within the pine forest. Additional rationale on why the alternative was considered but eliminated is located in the DEIS at page 56. In response to the concern over emissions from prescribed fire, Alternative D was developed. Alternative D decreases the acres that would receive prescribed fire by over 60 percent (actually 69 percent) when compared to alternative B

(proposed action). The DEIS at page v only states prescribed fire would be reduced by 30 percent. This is incorrect and has been corrected in the FEIS. Prescribed fire (pile, broadcast, and jackpot burning) would occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. Coordination with ADEQ would take place through the Kaibab and Coconino NF Zone Dispatch Center and the prescribed fire Burn Boss (web-based DEIS, FE2, page 568). Emission reduction techniques (ERTs) that are recommended by Arizona ADEQ would be utilized when possible to minimize impacts to sensitive receptors (including communities) of burn unit(s) (web-based DEIS, FE3, page 568). The DEIS describes mitigation and design features that would be used to reduce emissions from prescribed fire including:(1) Reducing the emissions produced for a given area treated, (2) Redistributing/ diluting the emissions through meteorological scheduling and by coordinating with other burners in the airshed. Dilution involves controlling the rate of emissions or scheduling for dispersion to assure tolerable concentrations of smoke in designated areas, and (3) Avoidance uses meteorological conditions when scheduling burning in order to avoid incursions of wildland fire smoke into smoke sensitive areas (DEIS, FE9, page 570).

Inch, Terry	My family all support the maintenance and health of our wonderful forests. We hike regularly and enjoy this incredible natural asset, both in the Verde Valley and also Flagstaff. We have experienced the devastation of our recent forest fires first hand and understand the need for forest thinning and clearing; however, Forest management must include an overall perspective of the results of burning and take into account human health as well as the that of the forests.	(119-2) Thank you for your comment. While we understand your opposition to the use of prescribed fire, not using fire in the ponderosa pine fire-adapted ecosystem would not allow for maintaining a healthy forest ecosystem. Also see our response to letter #6, #11 and #74. The fire ecology analysis does address how emissions would change (be reduced) after the initial entry burn.
Ingold, John	My understanding that noise impact is part of the NEPA DEIS. Under the 4 FRI DEIS, I would like to emphasize noise impacts of off-road vehicles to adjacent urban residential areas in Flagstaff, specifically where the vehicles are officially prohibited by law in the surrounding national forest.	(213-1) Thank you for your comment on the 4FRI DEIS. We understand that you are upset about the continued use of roads closed for motor vehicle use. However, your comment is outside the scope of the decision being made for this specific restoration project. Your comment and contact information will be forwarded to the Travel Management Rule team.
Ingold, John	This also should be an enforcement consideration for any offlimits area adjacent to any residential areas included in the 4 FRI. When the Forest Service published its latest Motor Vehicle Use Map for the Coconino National Forest on April 15, 2012, my experience is that	(213-2) Your concerns regarding travel management have been forwarded to the travel management team.

Jablonsky, Cara	enforcement actions of the simplest form have not been undertaken. For example, my family lives on the forest boundary in south Ponderosa Trails in Flagstaff. As of April 15, 2012, the designated national forest section immediately south prohibited motor vehicle use. However, to date, no forest access points to this area from the surrounding paved city streets are signed as prohibited to vehicles-motorcycles-ATVs or any other off-road vehicle. Likewise, no barriers are in place. In 2012, after email and phone correspondence with Forest Service's Mike Dechter, who is designated as the new Travel Management rule manager, no actions will be taken to signify this area as designate off limits to motor vehicles. Particularly in the spring, summer and fall, we experience frequent ATV and motocross traffic on any given day and time in the adjacent national forest that is supposedly off limits. My comments to Mr. Dechter was simply couldn't the forest service provide some basic level of signage or enforcement at the residential-off limits forest interface. Basically, I was told no and to date have not seen any level of enforcement, notification, education, physical prohibition, or elsewise from the Forest Service. My simple comment is please help enforce the designated vehicle-ATV prohibition in residential-forest interface areas under existing or any future National Forest plans. My few simple personal efforts to educate some of the illegal motorcycle and ATV users have subjected my family to threats and have had our house "egged". Please be aware of this conflict. I strongly believe the Forest Service's authority to place basic signage and enact occasional enforcement can go a long way to help the peace of mind of homeowners at this interface. I am willing to meet with any member of the Forest Service to review this situation and provide a tour of the problem area. Thank you for your service and any future efforts. Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting	Thank you for your comment. Please see our response to Letter #19.

	wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Jesse, Ellen	We all know that, even with the best of intentions, intentional burns have often gone out of control. In this time of drought, to burn the forest is probably not the best of ideas.	(112-1) Thank you for your comment. Your concerns are noted.
Jesse, Ellen	Also, consideration should be given as to the destruction of wildlife	(112-2) Thank you for your comment. The purpose and need for this

	and the habitat such life depends upon. I think that life should be valued over man's preferences as to types of vegetation.	restoration project may be found on page 8 of the DEIS. (14-1) Thank you for your comment. The project includes design features and mitigation to address the potential for non-native invasive weeds. Appendix C of the DEIS (web version) displays those design features on page 567 to 568, see B15 and B16. The project would follow the guidance in appendix B of the "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott NFs within Coconino, Gila, Mojave, and Yavapai Counties, Arizona" including: (1) surveying the treatment area and evaluating weeds present before implementation; avoiding or removing sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds, (2) treating weed infestations within treatment units before implementing treatments, (3) managing prescribed fires as an aid to control of existing weed infestations and to prevent the spread of existing weeds, and (4) monitoring slash pile sites after burning and control noxious or invasive weeds (web-based DEIS, Appendix C, B15, page 567). Regarding fire, the purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity - this includes returning fire to the landscape (see web-based DEIS, Table 31, Forest Resiliency and Sustainability-Fire Behavior, pp. 99-100).
jjrdm@npgcable.com, Anon	You talk about "fire-adapted ecosystems, I hope that doesn't mean replacing indiginous species with something else that could become invasive. As for the underbrush, George Bush, "W" that is, said we made a mistake in putting out every fire that started. Yes, we need to put out human caused fires, but let nature caused fires burn. Maybe it's time to put nature back into the equation. As much as possible we need to let nature take care of that underbrush. Nature works for free.	(14-2) Thank you for your comment. No permanent road construction would occur. However, we would need to construct up to 517 miles of temporary roads in order to access the project, see DEIS, table 1, on pages vi and vii. The roads would be decommissioned once the project is complete. The project includes design features and mitigation to reduce the impacts from the temporary road construction to wildlife. For example, road construction, decommission, relocation, and maintenance would not occur inside MSO PACs during the breeding season (March 1–August 31) if occupied (web-based DEIS, page 593, W17). Hauling would not occur within MSO PACs during the breeding season (March 1–August 31) except where specific analysis has documented that impacts would not lead to adverse effects (web-based DEIS, page 593, W19). Note, in the FEIS the term "obliteration" has been corrected to "decommission".
jjrdm@npgcable.com, Anon	Do I have this right, this proposal calls for a lot of roads? Roads are disruptive of wildlife, and usually not friendly to a forest. They should be put in only minimally, and never made permanent.	
jjrdm@npg	I'm sure these are all things you know. I'm just repeating them. I	(14-3) We appreciate the time you took to comment on the project.

cable.com, Anon	don't think a lot of people know about this, and I only just found out about it and so haven't had time to really review it. I really don't know where I stand, so maybe we shouldn't.	
John, Drew	Graham County is located in eastern Arizona beneath the Mogollon Rim that marks the southern edge of the Colorado plateau. Graham County has been a stakeholder in the effort to develop and implement landscape scale forested ecosystems restoration for the last decade and has been involved in the creation of the White Mountains Stewardship Project; the Governor's Forest Health Council's Statewide Strategy for Restoring Arizona Forests; the collaborative Analysis of Small-Diameter Wood Supply in Northern Arizona; and, what has become the Four Forest Restoration Initiative. Graham County appreciates the opportunity to comment on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative, and would like to offer the following comments, gap analysis and suggested actions.	(89-2) We appreciate your explanation of the positioning of the 4FRI within Graham County's boundaries and the concerns of your county regarding 4FRI's activities.
John, Drew	Graham County ("the County") is located in eastern Arizona beneath the Mogollon Rim that marks the southern edge of the Colorado Plateau. Four characteristics of the County are particularly relevant to the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative ("the 4FRI DEIS"): 1) One of the four national forests regrouped into the Four Forest Restoration Initiative ("4FRI"), the Apache-Sitgreaves National Forests, is located within Graham County. 2) The landscape scale catastrophic wildfires in the national forests of the Southwest have a disproportionately large impact on the ecological, social and economic life of Graham County and the neighboring eastern Arizona counties, and on the health and safety of their residents and visitors. Four of the five largest wildfires in Arizona, including two of the largest wildfires in the nation, have occurred within the five counties of the Eastern Arizona Counties Organization in the last decade: the Rodeo Chediski Fire of 2002 that consumed 460,000 acres; the Willow Fire of 2004 that burned 120,000 acre; the Cave Creek Complex Fire of 2005 that blazed through 244,000 acres and the Wallow Fire of 2011 that charred 538,000 acres. 3) Outdoor recreational activities conducted in the 4FRI national forests, such as, but not limited to, camping, motorized recreation, hunting, fishing, hiking, etc. by the local residents, and by	(89-3) Please see the response to #89-2.

John, Drew	visitors to the County recreating from metro Arizona to the Rim Country, have a disproportionately large impact on the economic well-being and the economic development of the County. 4) The County has made a long term commitment to proactively participate in, assume leadership roles in and provide political support at the state and federal levels for forest restoration and wildfire prevention efforts at local and landscape scales, such as the White Mountain Stewardship Project and the Four Forest Restoration Initiative that the County has been instrumental in creating and fostering. As such, Graham County has a special interest in the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative. While Graham County recognizes that it is only one of the many constituents of the U.S. Forest Service, and does not seek special consideration in the current comments and review process, we urge the Responsible Official to pay careful attention and give due consideration to the following comments in view of the uncommonly large effect that Forest Service land management decisions regularly have directly, or may occasionally have indirectly, on the County' residents and visitors' enjoyment, custom, culture, health, safety and economic well-being.	(89-4) Thank you for your comment.
John, Drew	Graham County recognizes that the 4FRI DEIS is a Forest Service-driven technical process, and generally supports the analysis mechanisms deployed by the USFS 4FRI Team to complete the assessment and the technical part of the planning. Although Graham County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as an organization representing the most direct and local expression of democratic government at the individual district or national forest level, the County more generally defines its role at the policy-making level as it relates to public lands management processes. Therefore, although several of the following comments do apply to the technical aspects of the 4FRI planning processes, they purposefully do not address specific technical mechanisms thereof, and Graham County is mostly satisfied that the USFS methodology is generally satisfactory, and that the studies that the USFS 4FRI Team in their	(89-5) Thank you for your time and attention.

	expertise deem reliable, are adequate to support their technical conclusions (Lands Council v. McNair 537 F.3d 981 - 9th Cir. 2008). Therefore, Graham County will focus its engagement in the 4FRI DEIS process, and its comments and suggestions, at the policy-making level and on whether the 4FRI Preferred Alternative contributes to the County's residents' and visitor's enjoyment, custom, culture, health, safety and economic well-being. The County will further focus its engagement on whether the 4FRI Preferred Alternative is consistent with the objectives of the County as expressed in its plans and policies; on how the 4FRI project impacts related planning efforts by the County; and, on the compatibility with and interrelated impacts of the 4FRI project and the County's plans and policies.	
John, Drew	Per the requirements contained in the 2012 Planning Rule, Title 36 - Parks, Forests, And Public Property, Part 219 - Planning, Subpart A - National Forest System Land Management Planning, Section 4 - Requirements for public participation, subsection (b) Coordination with other public planning efforts, Graham County expects that: "The responsible official shall coordinate land management planning with the equivalent and related planning efforts of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments" (36 CFR 219.4 (b)(1)).	(89-6) Thank you for referencing the 2012 Planning Rule. This project has been reviewed against the direction in the current "Coconino National Forest Plan" (forest plan), as amended (USDA 1987), the "Land and Resource Management Plan for the Kaibab National Forest, as revised" (USDA 2014) and 36 CFR 219.17(b) (3). For clarification, this project has proposed three nonsignificant forest plan amendments for the Coconino NF. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule.
John, Drew	Graham County further expects that: "The results of this review shall be displayed in the environmental impact statement (EIS) for the plan", and that "this review shall include consideration of: (i) The objectives of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments, as expressed in their plans and policies; (ii) The compatibility and interrelated impacts of these plans and policies; (iii) Opportunities for the plan to address the impacts identified or to contribute to joint objectives; and, (iv) Opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives" (36 CFR 219.4 (b)(2)).	Please see the response to #89-6 for information concerning the relevant planning rule under which 4FRI was initiated.
John, Drew	Graham County posits that these statutory requirements are meant by Congress to imply more than a perfunctory review process resulting in a check mark in a 'coordination box' and imply a sincere	(89-8) The comments from Graham County – as well as other comments received during the official comment period – have been read, reviewed, and discussed by the 4FRI specialists. A summary of

	and proactive resolution effort to reduce and resolve potential conflicts between aspects of 4FRI DEIS and objectives expressed in the County's plans and policies; such as, but not limited to, those relevant to forested ecosystems restoration and catastrophic wildfire prevention objectives, watersheds restoration objectives, rangelands resources management objectives, or forest products resources management objectives. Graham County is committed to resolve or reduce potential conflicts between the 4FRI DEIS and the County's plans and policies, and understands that such resolution must take place within the context of developing the 4FRI project's desired conditions or objectives. To this effect, it is the intent of Graham County to avail itself of the opportunity contained in the 2012 Planning Rule that specifies that: "Where appropriate, the responsible official shall encourage States, County, and other local governments to seek cooperating agency status in the NEPA process for development, amendment, or revision	responses by topic will be part of the FEIS. The complete individual comment analysis will be posted on the project's website and filed in the project record. The Forests have collaborated with 4FRI stakeholders and interested publics including the Eastern Counties Organization. The DEIS (chapter 1) and FEIS (chapter 1) documents how collaboration was used during the planning process.
John, Drew	of a plan" (36 CFR 219.4 (a)(1)(iv)). The County's policy making decisions and management actions are guided by the County plan. This plan guides the actions of the Board of Supervisors and the County staff toward meeting the present and future enjoyment, custom, culture, health, safety and economic well-being needs of the County's residents or visitors. The County planning effort integrates the principles of: 1) Monitoring the effects and impacts of the implementation of the County policies, as well as the direct, indirect, individual and cumulative effects and impacts on the County and its residents and visitors of the policy decisions and management actions taken by state and federal agency partners; 2) Monitoring all demographic, social, economic, cultural and other variables, whether internal or external, which are relevant to the County's policy making decisions and management actions; and, 3) Dynamic and generally informal adaptive management. As such, the County plan is an evolving dynamic plan that constantly adapts, often informally, in response to the evolving ecological, economic, social and cultural environment, and that is formulated as much through the regular deliberations of the County's Board of Supervisors and the resulting Resolutions of the Board, as it is in the formal planning	(89-9) In 2011 the Arizona Game and Fish Department (AGFD) was designated a cooperating agency. The AGFD provided wildlife data and wildlife analysis support for this project-level environmental analysis (DEIS, Chapter 1).
John, Drew	documents. For the purpose of compliance with the statutory	(89-10) Thank you for your comments. All comments received on this project have been filed in the project record.

John, Drew	requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), the County plan defined as the accumulation of the formal County planning documents and the County public record of Board of Supervisors deliberations and resolutions, is hereby entered into the 4FRI NEPA record. Graham County appreciates and supports the extensive and thorough analysis performed by the USFS 4FRI Team for the 4FRI DEIS, and the discussion of the effects of the no action alternative and the three action alternatives on: Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; Transportation; Climate Change; Short-term Uses and Long-term Productivity; Unavoidable Adverse Effects; Irreversible and Irretrievable Commitments of Resources; and, Cumulative Effects. Multiple resources analyzed individually by the USFS 4FRI Team in the 4FRI DEIS are regrouped in a smaller number of overarching natural resources management policy objectives by the County. In no particular order, the County's natural resources management objectives relevant to the 4FRI DEIS comments include: 1) Rangelands Resources Management Objectives. Rangelands Resources Management Objectives address issues such as, but are not limited to, grazing availability, suitability, sustainability; ecological, economic and social carrying capacity; access; contribution to rural economic development; and, contribution to local Western custom and culture. 2) Forest Products Resources Management Objectives. Forest Products Management Resources Objectives address issues such as, but are not limited to, logging availability, suitability, sustainability, productivity, access; contribution to rural economic development; and, contribution to rural Western custom and culture. 3) Mineral and Energy Resources Management Objectives. Mineral and Energy Resources Management Objectives address issues such as, but are not limited to, the availability, suitability, sustainability, productivity, access, and contribution to rural economic development of (a) solid, liquid or gaseous mineral resources and (b) solar, wind, hydropower,	(89-11) For clarification, this analysis will not make grazing authorization decisions. This analysis will not be determining whether a road or route will be closed or part of a designated, transportation system. Those decisions occur in travel management-related analyses.

geothermal and other natural renewable energy resources. 4) Motorized Travel and Recreation Management Objectives. Motorized Travel and Recreation Management Objectives address issues such as, but are not limited to, motorized access; motorized travel; motorized big game retrieval; motorized dispersed camping; motorized gathering of firewood; motorized access to dispersed fishing; motorized recreation opportunities; inventoried roadless areas; wilderness area designation; motorized access to grazing and logging opportunities; contribution of motorized access, recreation and travel to rural economic development; and, contribution to local Western custom and culture. 5) Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives. Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives address issues such as, but are not limited to, protection of County's residents and visitors; protection of collective and individual real properties; protection of transportation, energy and water collection and distribution infrastructures; ecological restoration of forested ecosystems; local scale restoration projects; landscape scale restoration projects; social license required for the non-conflictual and non-litigious implementation of restoration efforts (such as the one requested in public statements by former USFS Southwestern Regional Forester Corbin Newman for the Four Forest Restoration Initiative); industry development required to implement and fund restoration efforts through economically viable utilization of the wood products; and, long term guarantees of wood supply necessary to attract private investments in a small diameter utilization infrastructure in northeastern Arizona. 6) Watershed Restoration Objectives. Watershed Restoration Objectives address issues such as, but are not limited to, ecological restoration of watersheds; protection and development of water collection and distribution infrastructures; monetization of watershed ecosystem services; downstream consumption contribution to upstream production investments and maintenance; and, interactions between watershed functions and multiple use functions. 7) Management Areas Designation Objectives. Management Areas Designation Objectives address issues such as, but are not limited to, the nomination, designation, and management of (a) inventoried

	roadless areas (which are technically not management areas per se but are an administrative designation) and (b) wilderness areas, primitive areas, research natural areas, wildlife quiet areas, and wild and scenic rivers; and, effects on socioeconomic resources and impacts on the other County objectives. Graham County understands that some of these objectives are not directly relevant to the 4FRI DEIS inasmuch as, for example, the 4FRI alternatives are not contemplating the designation of management areas. However, most of these objectives are relevant to the 4FRI DEIS, inasmuch as the 4FRI alternatives either have direct effects on some County's objectives, such as Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives; Forest Products Resources Management Objectives; Watershed Restoration Objectives; and, Rangelands Resources Management Objectives; or, may have indirect effects on some County's objectives, such as Motorized Travel and Recreation Management Objectives. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), this document: Graham County comments on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative is hereby	
John, Drew	incorporated into the County's expressed plans and policies. Graham County, therefore, expects that: i) the Responsible Official shall coordinate land management planning with the County equivalent and related planning efforts (36 CFR 219.4 (b)(1)); ii) the consistency review and coordination action shall include consideration of the objectives of the County as expressed in its plans and policies; and, iii) the Responsible Official shall consider opportunities to resolve or reduce conflicts, should some arise between the 4FRI DEIS and the County's objectives (36 CFR 219.4	(89-12) General information has been provided. No response is required.
John, Drew	(b)(2)).	(89-13) Thank you for your comments. We have collaborated with the counties since the project was initiated. Since the counties have been part of the 4FRI stakeholder group, we have considered comments received from all publics, including the stakeholders.
John, Drew	Per the requirements of 36 CFR 219.4 (b)(2), 40 CFR 1502.16(c) and 40 CFR 1506.2, Graham County hereby requests that the results of the consistency review and coordination action between the 4FRI DEIS and the County's objectives as expressed in its plans and policies shall be displayed in the Four Forest Restoration Initiative Environmental Impact Statement.	(89-14) Thank you for your comments. All comments received on the draft EIS from Federal, State and local agencies have been included in appendix I of the FEIS on pages 925 to 994. This satisfies Section 102 (c) of NEPA which states, comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the

		Council on Environmental Quality and to the public. Although the project only directly affects Coconino County, comments from the Eastern Arizona Counties Organization has been included to reflect similar comments received from Apache, Gila, Graham, Greenlee and Navajo County. Per 40 CFR 1503.4, summarized responses to comments received on the draft EIS are included in this appendix. They have been organized by topic. All comments received on the draft EIS are available for public review at: https://cara.ecosystem-management.org/Public/Letter/172405?project=34857. All comments received were reviewed and responded to individually. The complete comment analysis and response document is located in the project record and is available on the project's website at: http://www.fs.usda.gov/main/4fri/planning.
John, Drew	Graham County appreciates and supports the fact that all three action alternatives include a clear priority for restoration treatments (PDEIS p. 62).	(89-15) Thank you for your comment. For clarification, the DEIS was not programmatic but site-specific. We assumed the (PDEIS) reference in this comment was to a programmatic document.
John, Drew	Graham County recognizes that the issues of forested ecosystem restoration and forest products management are fundamentally different, and are typically not discussed simultaneously in ecosystems non-departed or little departed from characteristic reference conditions. However, as the Forest Service and the County both generally acknowledge: current conditions in the forested ecosystems and especially in the ponderosa pine and dry or wet mixed conifers-dominated forests of eastern Arizona are considerably departed from reference conditions, and at risk of continued uncharacteristic disturbances such as landscape scale catastrophic crown fires or insect infestations. Also, Graham County acknowledges and appreciates the efforts made by the Forest Service, and particularly the Arizona national forests, to pioneer larger scale restoration efforts such as the White Mountains Stewardship Project. The County has been and continues to be supportive of the White Mountain Stewardship Project and of its funding as a practical tool to initiate larger scale treatments and to incentivize the creation of a small diameter trees utilization infrastructure. Simultaneously, the County acknowledges that the model of subsidized restoration treatments is not scalable at landscape level, as is required to restore the forests of Arizona, for	(89-16) Thank you for this information.

	lack of agency funding. As proposed in the Four Forest Restoration Initiative, an initiative that the County was instrumental in creating, fostering and developing, landscape scale forest ecological restoration appears currently feasible only if it is funded by the economically viable utilization of the forested byproducts of restoration by private industry. While it is actually not a novation when it comes to forest products, as timber sales have been for centuries an established form of natural resources valuation and have funded the management of the resources, the concept of ecosystem services monetization is relatively new to the discussion of ecological restoration funding, and its full implications are still being tested. As a consequence, Graham County suggests that both the County and the USFS 4FRI Team operate under a very specific constraint when it comes to forest restoration, inasmuch as the forest products industry in Arizona is the funding mechanism for landscape scale restoration in eastern Arizona, which imposes the concept of social acceptability or 'social license' for appropriate scale industry to fund restoration logging activities at the landscape scale throughout the	
John, Drew	4FRI project.	(89-17) Thank you for comment.
John, Drew	Graham County's Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives for the upcoming planning cycle include, among others: 1) Design and implement landscape-scale, consensus-based, industry-supported, accelerated community protection and forested ecosystems restoration in the 2.4 million acre ponderosa pine and mixed conifer-dominated forests of the Mogollon Rim. 2) Develop and sustain the social license required by Southwestern Regional Forester Corbin Newman as a prerequisite to the implementation of industry-supported landscape scale restoration. 3) Participate actively in the NEPA process, as a member of the public and as a Cooperating Agency, and provide robust comments to the Forest Service to ensure NEPA process integrity and survivability in the face of potential threats of litigation. Emphasize with the Forest Service a strategy of risk mitigation and focus on the end goal of accelerated restoration over partisan debates and exclusive focus on technical sciences to the detriment of social science and social license. 4) Create in eastern Arizona the wood	(89-18) Thank you for your comment.

	supply conditions for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 5) Wherever and whenever possible, prioritize forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona with multiple industrial scale new investments.	
John, Drew	Graham County appreciates and supports the fact that all three action alternatives include a clear focus on mechanical restoration treatments yielding forest products (PDEIS p. 62).	(89-19) Thank you for your comment.
John, Drew	The inherent challenge faced by Graham County and the USFS 4FRI Team is that the priorities typically considered when managing forest products, such as a sustained yield of harvest volumes on a regulated non-declining even-flow basis for the long term, uneven age structures, long term sustained yield capacity (LTSYC), non-declining allowable sale quantity (ASQ), etc., are augmented and complicated, and to a large extent superseded, by the overwhelming priority to complete landscape scale restoration as rapidly as possible for fear of massively disruptive landscape scale catastrophic crown fires and/or landscape scale insect or disease infestations. Owing to the fact that for the foreseeable future green forest products will likely be byproducts of restoration treatments, and green forest products will likely continue to be at risk of destruction by catastrophic fires if landscape scale restoration is not expeditiously implemented, the County suggests that forest products management actions for the upcoming planning cycle must be dictated not only by traditional silviculture science and best practices, but primarily by the absolute priority of implementing landscape scale restoration as expeditiously as possible using mechanical treatments that produce the forest products necessary to not only sustain the existing forest industry in the White Mountains, but also to allow robust natural resources-	(89-20) Thank you for your comment. As noted, the DEIS socioeconomic analysis (web-based DEIS, pp. 272-284) evaluated the direct and indirect economic output for each alternative.

	based rural economic development through the creation of an entirely new infrastructure of small diameter trees utilization at industrial scale. 1) Create in eastern Arizona the wood supply conditions necessary for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 2) Sustain in the White Mountains the wood supply conditions necessary for the continued development and growth of the existing local industry, with expanded economically viable small diameter trees and residual biomass utilization facilities capable of funding the initial ecological restoration thinning of at least 15,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 3) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for sustained yield of harvest volumes on a regulated, non-declining even-flow basis for the long term, to the overriding priority of implementing as expeditiously as possible landscape scale restoration based primarily on mechanical treatments producing forest products. 4) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for uneven age management to the overriding necessity of sustaining the social license required to implement landscape scale restoration expeditiously and in a non-conflictual and non-litigious manner, as relates to the protection of old growth and the retention of large trees (upcoming old growth) where vegetative structural stages (VSS)	
John, Drew	5 and 6 are deficient at stand or forest scale.	(89-21) Thank you for the information.
John, Drew	Graham County appreciates and supports the analysis performed by the USFS 4FRI Team using the Watershed Condition Framework (WCF) to identify 6th level Hydrologic Unit Code (HUC) Class 1 (Functioning), Class 2 (Functioning-At-Risk) and Class 3 (Impaired)	(89-22) Thank you for your comment.

John, Drew	watersheds in the 4FRI project area, and to analyze the direct and indirect effects of the 4FRI project on water quality and water yield. Uncharacteristic landscape scale forest crown fires in eastern Arizona have a demonstrated negative impact on the conservation and operation of the watersheds in which they occur. In addition to the damages caused to communities and ecosystems by the fires themselves, the most common negative effects on watersheds documented after the Rodeo-Chediski Fire, the Wallow Fire, in some areas, and the Schultz Fire, among others, are: uncharacteristic runoffs, catastrophic flooding, accelerated and aggravated soil erosion, streams and reservoirs sedimentation, and long term severe disturbance of the watershed functions.	(89-23) Thank you for your comment concerning the effects of high-severity fire on watershed functions.
John, Drew	The Rim Country constitutes a large portion of the watersheds that contribute significantly to the water supply of the metro Arizona and greater Phoenix area. The threat of additional uncharacteristic landscape scale forest crown fires in eastern Arizona, especially on the south slopes of the Mogollon Rim, raises serious concerns about the conservation and operation of the eastern Arizona watersheds. Additionally, the specific risk to the East Clear Creek watershed poses an existential threat to the Town of Payson's water supply. With the growing realization that uncharacteristic landscape scale forest crown fires affect the conservation and operation of the watersheds in which they occur, efforts to protect watersheds have recently been initiated in the Southwest. Several of these efforts focus on the monetization of the ecosystem services provided by the watersheds, and on an attempt to enroll the financial contribution of the downstream beneficiaries of the services (water consumers in this case) to the financial costs of protecting the upstream provider areas and the utility corridors delivering the services (forests, watersheds and water collection and distribution infrastructures at risk of catastrophic fires in this case). Such efforts were pioneered by the Denver Forest to Faucet project in Colorado, or the Santa Fe Municipal Watershed Protection project in New Mexico, among others. In Arizona, with the active contribution of Graham County, an effort to create the Arizona Watersheds Investment Fund (AWIF) is underway, and in Flagstaff, Ballot Question #405 received electors' approval in November 2012 for the issuance of a $10 million	(89-24) Thank you for your comment concerning the effects of high-severity fire on watershed functions.

John, Drew	municipal bond to finance the restoration treatments of high threat areas in the Rio de Flag and Lake Mary watersheds to provide greater protection to the community from the impacts of fires and floods. Therefore, the restoration of forested ecosystems, ponderosa pine and mixed conifer-dominated, in the watersheds of the Mogollon Rim in general, and specifically in the East Clear Creek watershed, is an objective priority, among other areas in eastern Arizona also in need of restoration treatments, for Graham County, after the direct protection of communities and infrastructures.	(89-26) Thank you for your comment.
John, Drew	Graham County's Watershed Restoration Objectives for the upcoming planning cycle include, among others: 1) Prioritize restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures, on the slopes of the Mogollon Rim in general, and specifically in the East Clear Creek, Verde River, Little Colorado River, Upper Gila River, and Upper Salt River watersheds. 2) Develop the Arizona Watersheds Investment Fund (AWIF), and/or similar initiatives in order to fund restoration treatments that cannot be funded by the wood industry utilization of the forest byproducts of restoration in areas where the merchantable material yield is insufficient for mechanical treatments to be economically viable, or access by mechanical harvesting equipment is restricted, such as in steep slopes, high erosion areas, riparian areas, etc. 3) Develop in parallel and in a complementary manner all models of watersheds restoration funding such as industry funding, ecosystem services funding, municipal bonds funding, etc.	(89-29) Thank you for this information.
John, Drew	Graham County appreciates the addition of grassland restoration treatments to forestland treatments in Alternative C, the Preferred Alternative. The County believes that this addition is significant not only because it implies the restoration of approximately 50,000 acres of rangelands, but because it aptly diversifies the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape restoration.'	(89-30) Thank you for your comment.
John, Drew	Graham County's Rangelands Resources Objectives for the upcoming planning cycle include, among others: 1) Restore encroached grasslands, including the most departed semi-desert, Great Basin,	(89-31) Thank you for your comment.

and montane subalpine grasslands that have been invaded by trees (subalpine grasslands) and shrubs (semi desert and Great Basin grasslands) by removing trees and shrubs where economically feasible, promoting a mixture of native perennial grass species, implementing the periodic prescriptive use of mixed classes of livestock matching animal feeding habits with specific plant material, and reintroducing a regime of cool surface fires in order to reduce trees and shrubs colonization and erosion hazards, and to increase livestock forage production. 2) Adopt management practices that discourage the establishment of nonnative species and eradicate invasive weed species that have little to no forage value, recognizing the fact that the ecological or economic consequences of different exotic species are not all the same, and that the persistence of some nonnative species that are not necessarily undesirable or controllable, such as Kentucky bluegrass or Bermuda grass, may be beneficial from a socioeconomic perspective and a balanced management for multiple resource objectives. 3) Allocate grass reserves on an allotment-by-allotment basis through proper range management, rather than on a district-by-district basis, which requires additional financial considerations for improvement maintenance. 4) Shift the grassland management process from the concept of balancing livestock grazing with available forage - which only addresses stocking rate - toward the concept of managing the intensity, frequency, seasonality, duration and classes of livestock grazing to accomplish the rangelands resources management objectives. 5) Emphasize adaptive management of the rangelands using a three step rangelands resources management monitoring approach of quantitative monitoring using standard measurements such as stocking rate, ground cover, etc.; qualitative monitoring using measurements such as species composition, age, nutritional value, etc.; and, effectiveness monitoring using outcome measurements such as range health, soil water holding capacity, soil organic content, livestock weight gain, wildlife indicator species, etc., in order to measure whether the management actions produce the site specific and cumulative direct and indirect effects desired. 6) Integrate the scientific research and implement the science-based recommendations developed by rangelands resources management

John, Drew	experts and scientists. 7) Preserve the contributions of the rangelands resources to the economic development and the custom and culture of the rural Arizona counties. Graham County would like to preface any subsequent comment by the following four preliminary comments: 1. The quality and thoroughness of the work exhibited by the USFS 4FRI Team in the 4FRI DEIS is outstanding. Graham County is fully conscious of the fact that an enormous commitment was made and delivered upon by the USFS 4FRI Team, and that a legitimate pride of ownership must rest with the authors of the DEIS, as well as the Specialists' reports and other documents not published with the 4FRI DEIS but nonetheless part of the 4FRI project record. The County urges the USFS 4FRI Team to consider the County's comments NOT as a critic of their work, but as a goodwill effort toward continuous improvement of the 4FRI EIS, and as a proactive effort by the County to disclose its objectives, plans and policies, and the rationales that support them, to facilitate the statutorily required consistency review, coordination action and conflict reduction regarding potential discrepancies between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and as discussed in this document. 2. Strategically, Graham County overwhelmingly supports the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the following suggestions. Therefore, the following concerns and suggestions are not aimed at questioning the need to implement 4FRI but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process, which could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project as intended by the County. 3. Graham County readily acknowledges that several of the following comments and suggestions have already been addressed and agreed upon by the USFS 4FRI Team in the course of the work conducted by the DEIS Review Workgroup of the 4FRI Stakeholders Group with the USFS 4FRI Team. Also, considering the participation of the County in both the 4FRI Stakeholders Group and the DEIS Review Workgroup, there is a high probability that there will be some level of repetition and redundancy between the County's comments and the 4FRI	(89-32) Thank you for your review and comments. Thank you for recognizing the tremendous collaborative effort that has gone into the analysis, writing, and review creating the 4FRI DEIS. We appreciate your contribution to the further refinement of the DEIS by voicing your concerns and suggestions by way of your comments. Your concerns and suggestions have been noted in the specific responses to the comments which follow.

Stakeholders Group comments, as well as comments from other stakeholders. Nonetheless, the NEPA process calls for comments on the DEIS as published, and for the formulation of the County's concerns and suggestions, regardless of whether these are echoed in other comments or not. 4. As previously noted, although Graham County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as a body representing the most direct and local expression of democratic government at the individual district or national forest level, Graham County more generally defines its role at the policy-making level as it relates to public lands management processes. Graham County, therefore, believes that it is appropriate to comment at the programmatic level, from a Forest Service perspective, and at the objectives level, from a County's policy perspective.

For clarification, Graham County wants to emphasize that although it generally supports the use of Best Available Scientific Information (BASI) for management decision, it does not support the exclusive use of technical sciences to formulate policies or to make strategic decisions that have an important impact on people. The County believes that these decisions must integrate social sciences in the decision making process. For example, the County believes that while there is no overwhelming supporting science on either side of the long debated issue of a universal diameter cap for restoration treatments (whether it be 9", 12", 16" or 18"), analyzing the issue of a diameter cap from just a technical science perspective is at best incomplete, because the issue of large trees retention is not only a technical issue, but also a social issue that cannot be adequately addressed by an exclusively scientific approach. Therefore, Graham County comments will purposefully not emphasize technical issues of silviculture, such as uneven aged composition, regeneration openings, etc., but will be focused on what the County believe to be the crux of the successful and timely implementation of the overriding priority of landscape scale scientifically and socially acceptable – if admittedly imperfect – ecological restoration and catastrophic wildfire prevention. Namely: • Social acceptability of

John, Drew

(89-33) Thank you for your comment. We used the best available science when developing the purpose and need and analyzing the effects of each alternative. What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, scientific uncertainty, and risk. See 40 CFR, 1502.9 (b), 1502.22, 1502.24 (USDA FS 2007). In the DEIS, an alternative was considered but eliminated from detailed study that would have limited mechanical treatments to 8-inch d.b.h. This alternative was based on the assertion that crown fire can be effectively addressed with mechanical treatments that do not cut trees larger than 8 inches d.b.h. Small diameter mechanical tree cutting would be used to establish tree groups, nonforested openings (interspaces), and move toward a balance of tree age and size classes. Prescribed fire would be used to reduce litter and other surface fuels, stimulate herbaceous understory vegetation, prepare sites for natural ponderosa pine regeneration, and maintain interspaces. This alternative would partially address Issue 2,

	proposed treatments; • Speed of completion of landscape scale restoration; and, • Prioritization of treatments.	conservation of large trees, since mechanical treatments would be curtailed at 8-inch d.b.h. It would not achieve restoration desired conditions. It would resolve Issue 3, post-treatment canopy cover and landscape openness, since only small-diameter trees would be removed. However, approximately 73 percent of the 507,839 acres of ponderosa pine within the project area would not move toward forest structure and pattern desired conditions. Of all the even-aged stands, 47 percent (VSS 4), 8 percent (VSS 5), and 1 percent (VSS 6) would remain even-aged. There would be zero percent movement toward desired conditions in uneven-aged VSS 4 through VSS 6. For these reasons, this alternative was considered but eliminated from detailed study. The DEIS documents an alternative considered but eliminated from detailed study that would incorporate the 4FRI stakeholder group-created Large Tree Retention Strategy (LTRS, or also referred to as the Old Growth Protection and Large Tree Retention Strategy) as written. A modified version of the original strategy, the Large Tree Implementation Plan, or LTIP, was included in alternatives C and E. Table 15 in the DEIS displays a few excerpts from the original LTRS, the location of the excerpts in the LTRS, a crosswalk to the modified LTIP, and rationale why the original language was not accepted as written. For these reasons it was considered but eliminated from detailed study.
John, Drew	Alternative A, the no action alternative, does not offer the option of continuing an existing management approach to landscape scale forested ecosystems restoration in eastern Arizona inasmuch as there is currently no such approach. Alternative A would nonetheless result in the mechanical treatment of approximately 87,000 acres, and in the prescribed fire treatment of approximately 143,000 acres over the next five years (DEIS p. 62). However, the scale and pace of these management actions are incompatible with the urgent need to implement landscape scale restoration as identified in the purpose and needs for the 4FRI NEPA process. Therefore, Graham County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative A.	(89-34) Thank you for your comment.
John, Drew	Graham County understands the NEPA requirement for the 4FRI DEIS to analyze a no action alternative, and the County acknowledges and appreciates the existence of constituencies favoring no action. However, Graham County cannot support an alternative that would	(89-35) Thank you for your comment.

John, Drew	result in the continuation of an unmitigated high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Graham County is concerned that Alternative A is in direct conflict with the County's objectives as expressed in its plans and policies. Suggested action Graham County regrets to suggest that there is no possible corrective action to mitigate the incompatibility of Alternative A with the County's objectives as expressed in its plans and policies, or to resolve or reduce the conflict between Alternative A and the County's objectives as expressed in its plans and policies. Alternative A is so departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Graham County's natural resources management objectives, that it does not warrant any further discussion from the County's perspective.	(89-36) Thank you for your comment. We agree that alternative A (no action) would not meet the purpose and need for landscape-scale restoration (DEIS, pp8-29).
John, Drew	Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) both generally meet the purpose and needs of landscape scale restoration in eastern Arizona, as analyzed by the USFS 4FRI Team, and the County. For all practical purposes, Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) share many similarities: 1. The acreages treated, both mechanically and by fire-as-a-first-entry (approximately 388,000 acres treated mechanically and 588,000 treated with fire in Alternative B; and, approximately 434,000 acres treated mechanically and 593,000 treated with fire in Alternative C) are very similar; and, 2. The differences in acreage treated mostly result from the addition of grassland treatments to forestland treatments in Alternative C. Nonetheless, there are some differences between Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative): 1. The addition of grassland treatments to forestland treatments in the Preferred Alternative is significant inasmuch as it diversifies aptly the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape' restoration; 2. The increase in mechanical treatments upper limit from 16" to 18" diameter at breast height (d.b.h.) in the Mexican	(89-37) Thank you for your comments. See the DEIS page 58 to 61 for more information regarding why the original large tree implementation strategy was modified. A modified large tree implementation plan was included in the DEIS in appendix D.

	Spotted Owl Protected Activity Centers (MSO PACs) in the Preferred Alternative, while relatively minor from a treatments perspective, is likely to have an impact on the social acceptability of the proposed treatments; 3. The integration of some reworded components of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the Preferred Alternative is likely to have an impact on the social acceptability of the Preferred Alternative; and, 4. The integration of research projects in the Preferred Alternative is a welcome addition. Graham County clearly views the addition of grassland treatments to forestland treatments in Alternative C as a positive step toward meeting the County's Rangelands Resources Management Objectives, and generally supports the integration of research projects into restoration implementation projects, wherever and whenever feasible. The County further supports the integration of stakeholders-developed strategies and foundational documents such as the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the 4FRI DEIS. Conversely, Graham County is concerned that the adaptation of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) into the USFS 4FRI Team Old Trees Implementation Plan (OTIP) and Large Trees Implementation Plan (LTIP) may have an impact on the social acceptability of the Preferred Alternative, as further discussed in the later sections Old Growth and Large Trees. Therefore, Graham County generally supports the concepts presented in Alternative C, the Preferred Alternative, provided that it is further refined per the suggestions offered in the County's comments, as well as comments from other stakeholders critical to the viability of the 4FRI social license. However, Graham County is concerned that some decisions made by the USFS 4FRI Team may compromise the social license developed for the implementation of the 4FRI project. Consequently, Graham County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by some decisions made by the USFS 4FRI Team that may compromise the social license developed for the implementation of the 4FRI project, present a consistency gap	
John, Drew	between the 4FRI DEIS and the County's objectives as expressed in	(89-38) Thank you for your comments.

John, Drew	its plans and policies and in these comments. Suggested action Graham County respectfully suggests that the USFS 4FRI Team and the Responsible Officials exercise careful judgment in their decisions, in relation to: i) the true material importance of the issues, as opposed to their symbolic or emotional importance; and, ii) the potential effect of litigation on the implementation of the 4FRI project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' recommendations, and the major benefits attached to sustaining the 4FRI social license.	(89-39) Thank you for your suggestion. The Forest Supervisors will be reviewing all responses to the issues.
John, Drew	Alternative D is identical to Alternative B (the Proposed Action) as regards mechanical treatments. It is also identical to Alternative C (the Preferred Alternative) as regards mechanical treatments, except for the minor difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs). The critical difference between Alternative D and Alternatives B and C is the use of fire as a treatment. In alternative D fire would be used on only approximately 179,000 acres, compared to 588,000 acres in Alternative B and 593,000 acres in Alternative C. Graham County is concerned that the drastic reduction in the use of fire as a thinning treatment in Alternative D could prevent the timely completion of landscape scale restoration on the Mogollon Rim within the next 20 years as intended with the 4FRI project. The County favors, wherever and whenever possible, prioritizing forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona, with multiple industrial scale new investments. However, the County also recognizes that industry funded mechanical treatments are not appropriate in many sensitive areas such as steep slopes, fragile soils, riparian areas, etc., or in areas where the merchantable yield of restoration treatments would be economically unviable. Further, Graham County acknowledges that agency funded mechanical treatments or hand thinning are disproportionately expensive as	(89-40) Thank you for your comment. Please note alternative D was developed to respond to concerns people had with prescribed fire emissions. That is why the alternative would reduce the use of prescribed fire by about 69 percent when compared to alternatives B and C. Although the alternatives may appear to be the same (with the exception of the acres of prescribed fire), the effects in terms of creating a resilient forest is very different. In the FEIS, we have clarified the key ecological differences between the alternatives, see table 33 of the FEIS and chapter 3, environmental consequences.

John, Drew	compared to fire thinning, and the County appreciates that, as discussed in a different context but still related to the implementation of 4FRI treatments in the Apache-Sitgreaves National Forests Land Management Plan PDEIS: “the alternatives were realistically designed to reflect anticipated budgets and workforce capabilities,” and “none of the alternatives would actually treat enough acres fast enough to fully reach desired conditions within the first 5 decades” (A/S PDEIS p. 440). The use of fire as a treatment tool is, therefore, not a luxury from a timeline, economic or practicality perspective, but is instead a necessity. Additionally, the County believes that the ecological role of fire is absolutely critical to the long term ecological sustainability of the forested ecosystems of the Southwest, and that a management alternative that would reduce unduly the use of fire could compromise, in the long term, the implementation of post-treatment maintenance burns. In consequence, Graham County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative D. Graham County understands the NEPA requirement for the 4FRI DEIS to analyze significantly different alternatives, and the County acknowledges and appreciates the existence of constituencies concerned with prescribed fire emissions, and who favor alternatives such as Alternative D. However, Graham County cannot support an alternative that could reduce the scope and significantly slow the pace of landscape scale restoration in eastern Arizona, which could result in the unnecessary prolongation of a high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Graham County is concerned that Alternative D is not compatible with the County’s objectives as expressed in its plans and policies. Suggested action Graham County is concerned that there may not be a corrective action to mitigate the incompatibility of Alternative D with the County’s objectives as expressed in its plans and policies. Alternative D is too departed from the Mogollon Rim residents’ and visitors’ past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Graham County’s natural resources management objectives, to warrant further discussion	(89-41) Thank you for your comment. The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act (40 CFR 1501.2(c)) . The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more

	from the County perspective.	significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed (36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14). The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study.
John, Drew	Notwithstanding any of the above, Graham County is concerned about the three action alternatives and the range of alternatives that they represent. Specifically, even though Graham County recognizes differences between the three action alternatives as discussed in the previous sections Alternatives B and C and Alternative D, the County is concerned that the mechanical treatments in each of the three action alternatives are similar enough in scale, scope and intensity that the DEIS may not offer an actual range of alternatives when discussing mechanical thinning. Arguably, the difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl	(89-42) Thank you for your recommendation.

	Protected Activity Centers (MSO PACs) is minor, and the addition of grassland treatments in Alternative C or the reduction of fire treatments in Alternative D do not affect forestland mechanical treatments per se. Graham County itself is generally satisfied with the mechanical treatments proposed in alternatives B, C and D, provided these treatments are refined to integrate the suggestions of the County and other stakeholders integral to the 4FRI social license. However, the County is concerned that the 4FRI DEIS could be perceived as a DEIS based on a single alternative of mechanical treatments, with non-significant variations between the three action alternatives. Therefore, Graham County is concerned that the 4FRI DEIS may fail to comply with the Council on Environmental Quality (CEQ) requirements to provide and analyze a range of alternatives (Sec. 1505.1 (e) and Sec. 1502.14 (a)) and that the absence of a broader range of analyzed mechanical treatments alternatives may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a broader range of analyzed mechanical treatments alternatives, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Graham County respectfully suggests that the USFS 4FRI Team request a third party legal review of the NEPA and CEQ requirements in, and of the 4FRI DEIS compliance with, Sec. 1505.1	
John, Drew	(e) and Sec. 1502.14 (a).	(89-43) Thank you for your recommendation.
John, Drew	The degree of canopy openness in the immediate post-treatment conditions and in the long term desired future conditions has for several years been an issue of debate among the 4FRI stakeholders and the 4FRI collaborative group, including the USFS 4FRI Team, and is likely to remain one. This issue is linked to the discussion of whether vegetative structural stages (VSS) and canopy closure should be measured at group level, as proposed in the 4FRI DEIS, or at stand level, as currently implemented under the Coconino National Forest Plan. Amending the Forest Plan will resolve the technical compliance issue, but it does not address the more fundamental question of whether guidelines originally designed to be implemented at stand or even forest scale (outside Mexican Spotted Owl protected areas)	(89-44) Thank you for your comments. The issue of openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, "Interspace would occupy approximately 25 to 40 percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet." Table 118, on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. The implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example, pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement

are directly transferable, or not, to groups within stands. Additionally, the creation of interspaces between groups, in addition to the creation of regeneration openings within groups, will undoubtedly result in a significantly lower canopy density than was deemed desirable in the Management Recommendations for the Northern Goshawk in the Southwestern United States. Clearly, the USFS 4FRI Team has endeavored to be responsive to this concern, as evidenced in the 4FRI DEIS Appendix G Bridge Habitat, Appendix D Alternative B through D Implementation Plan, and in the silviculture Specialist Report. However, Graham County is concerned that the issues raised by partner agencies such as the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department, and by a broad range of stakeholders, have not yet been fully resolved. Questions remain about how and at what scale post-treatment canopy openness will be measured, and how group size, basal area (BA), stand density index (SDI), interspaces, regeneration openings, trees per acre (TPA), and quadratic mean diameter (QMD) interrelate to result in a trajectory toward desired future conditions. As previously noted, Graham County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Further, the County readily admits that it lacks the technical competence to contribute meaningfully to the resolution of arcane technical issues such as density management and the relationship between treatment intensity, tree group density, and overall average density, as relates to the implementation of post-treatment openness. Suffice it to say that the very fact that the discussion continues unabated is concern enough to the County that a zone of agreement has not been reached, or that the issues have not been understood clearly and broadly enough for the emergence of a general zone of agreement.

tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the red zone density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be

accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

John, Drew

Therefore, Graham County is concerned that the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, may be both a process risk and a social license risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk and social license risk for the 4FRI DEIS potentially caused by the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

(89-45) Please see the response to #89-44. Regarding wildlife habitat, we have included a summary of post-treatment openness in chapter 2 of the FEIS (summary of effects table). Post-treatment openness, with a summary of effects, been provided for Mexican spotted owl and goshawk. Also see appendix G of the FEIS.

John, Drew	Graham County respectfully suggests the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting the science or, if science is lacking, the reasoning backing their decisions to transfer the canopy density guidelines originally designed to be implemented at stand or even forest scale, to groups; 2. Answering specifically the stakeholders' questions regarding the assumptions made in Appendix G Bridge Habitat (for example: percentage of openness at stand level including interspaces and regeneration opening; percentage of existing old growth in old growth allocations; relative higher density of canopy in MSO and goshawk habitats post plan amendments; etc.); 3. Providing qualitative and quantitative 'visual' descriptions of post treatment objectives, including relative proportions and actual sizes of groups, stands, openings, etc., for each treatment type; and, 4. Explaining clearly how openness will be measured post treatments, how it will be monitored, how the monitoring data will trigger adaptive management, and at what thresholds.	(89-46) Thank you for your suggestion. Please see the response to #89-45.
John, Drew	As discussed above, and as analyzed in the 4FRI DEIS, forest plans amendments are technically required for 4FRI to be implemented under the current forest plans of the Coconino and Kaibab national forests. These amendments essentially address management actions (mechanical treatments up to 16" or 18" d.b.h., and low-intensity prescribed fire) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs); and (a) resolve the issues of desired percentage of interspace within uneven-aged stands; (b) add the interspace distance between tree groups; and, (c) add language clarifying where canopy cover is and is not measured to facilitate restoration in goshawk habitat (excluding nest areas). The amendments also remove the cultural resource standard that requires achieving a "no effect" determination, and allow for a "no adverse effect" determination. The amendments further remove language referencing monitoring of Mexican Spotted Owl Protected Activity Centers (pre- and post-treatment, population, and habitat), and defer to the U.S. Fish and Wildlife Service the monitoring and design of the treatments in Mexican Spotted Owl protected habitats. Graham County understands the technical necessity of amending the forest plans and has no specific issue with the concept. However, the	(89-47) Thank you for your comments. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52 (DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives

County is concerned about the decision of the USFS 4FRI Team to characterize the amendments as non-significant, and to defer 4FRI projects design and monitoring in Mexican Spotted Owl protected habitat to the U.S. Fish & Wildlife Service, without including the U.S. Fish & Wildlife Service monitoring plan and guidelines for projects design in the 4FRI DEIS. The Forest Service Manual provides guidance in Sec. 1926.52 Changes to the Land Management Plan That are Significant as follows: "2) Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period." In the USFS 4FRI Team's own analysis in Appendix B Forest Plan Amendments: "The canopy cover portion of the amendment would affect 139,308 acres (18 %) of all goshawk habitat on the Coconino NF and about 35 % of goshawk habitat within the project area" (DEIS p. 466); and: "The amendment would affect approximately 20 % of all suitable goshawk habitats on the forest and about 27 % of goshawk habitat within the project area" (DEIS p. 482). It is unclear to Graham County if there is an official percentage threshold for significance in the Forest Service regulations, but it seems that the common understanding of the word 'significant' - "a noticeably or measurably large amount" (Merriam Webster) - would include 35 % of goshawk habitat within the project area in the Coconino National Forest, or 27 % of goshawk habitat within the project area in the Kaibab National Forest. Citing these two percentages as precisely the reason why "For this reason, location and size (were) determined to be non-significant" (DEIS p. 466 and p.482) seems questionable, unless guided by an agency guideline, in which case a reference would be useful. Additionally, it is unclear how the canopy cover portion of the amendments would affect only 35 % and 27 % of goshawk habitat respectively, although the County speculates that it is related to higher vegetative structural classes (VSS). Further, Graham County is generally comfortable that habitat restoration and reduction of fire risk are key to improving Mexican Spotted Owl (MSO) habitat quality and, therefore, are aligned with both the current Coconino and Kaibab forest plans, as amended, and the U.S. Fish and Wildlife Service's (USFWS) revised MSO recovery plan (2012). However, the County is concerned that

are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51). With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in

deference of treatments design to another agency (USFWS) without integrating this agency's proposed treatments, or at least guidelines, in the 4FRI DEIS makes it impossible for the 4FRI DEIS Team to analyze the site specific and the cumulative effects of the treatments. Therefore, Graham County is concerned that the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the inclusion of a USWFS monitoring plan or treatments guidelines, and without the possibility to analyze their effects in the 4FRI DEIS, may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the possibility to analyze their effects in 4FRI, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments

appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C) Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments have been updated to reflect

changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS).

(89-48) Thank you for your suggestion. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane.

John, Drew

Graham County respectfully suggests that the USFS 4FRI Team request a third party legal review of the Forest Service Manual requirements in, and of the 4FRI DEIS compliance with, Sec. 1926.52 as relates to a determination of non-significance. Graham County further respectfully suggests that U.S. Fish and Wildlife Service monitoring plan and guidelines for the design of treatments in Mexican Spotted Owl protected habitats be incorporated into the 4FRI DEIS, and that their expected direct and indirect site specific effects be analyzed, presented, and integrated into the cumulative effects analysis.

(89-49) Thank you for your comments. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention"□ (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and

John, Drew

The adaptation of the stakeholders-developed single document Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) by the USFS 4FRI Team resulted in two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Large Trees Implementation Plan (LTIP) is discussed in the following section Large Trees. Clearly, the focus of the 4FRI stakeholders on old growth protection has been integrated by the USFS 4FRI Team in the 4FRI DEIS. Section C Old Trees Implementation Plan of Appendix D Alternative B through D Implementation Plan captures the essence of the stakeholders' old growth protection

strategy: “Old trees would not be cut for forest health issues or to balance age or size class distributions” (DEIS p. 644). Graham County also observes that, as required in order to comply with the forest plans, old growth allocation in the 4FRI DEIS meets the 20% minimum requirement for vegetative structural stage (VSS) 6 Old Forest; and Appendix D Section B Decision Matrix for establishing tree groups, interspace, and regeneration openings, preserves trees with old tree characteristics. However, Graham County observes that, past the affirmative statements in the 4FRI DEIS, the actual field decisions are left open to individual judgment. While “human health and safety” (DEIS p. 644) should be a fairly objective criteria, “additional habitat degradation” may be more open to interpretation, as illustrated in Section C Old Trees Implementation Plan itself where the example of prevention of additional habitat degradation involves … road construction! Further, Graham County also observes that the 4FRI DEIS states that “most sites (allocated to old growth) currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans” (p. 15). Considering that the purpose of allocating acres to old growth forest is to manage these acres for the fastest possible growth of existing trees toward VSS 6, there is a high likelihood that mature large trees in VSS 5 may be thinned in order to reduce competition for VSS 6 candidates. This decision also involves personal interpretation and individual judgment calls which may prove socially acceptable or disastrous based on the individual making the decision. Therefore, Graham County is generally satisfied with the Old Trees Implementation Plan (OTIP) and old growth management objectives stated in the 4FRI DEIS, but remains concerned that its implementation may be a social license risk for the 4FRI DEIS.

the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range." The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about

38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

John, Drew	Consequently, Graham County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by a misguided implementation of the Old Trees Implementation Plan (OTIP), may present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(89-50) Thank you for your suggestion. However, the intent of the project is to retain all pre-settlement trees unless there are public health and safety issues. See response to comment #89-49.
John, Drew	Graham County respectfully suggests that the USFS 4FRI Team include strict and restrictive guidance regarding the possible removal of old growth, including a maximum number of trees removed according to appropriate metrics such as possibly: per 10 acre block, per mile, per project, or similar.	(89-51) Thank you for your suggestion. However, the intent of the project is to retain all pre-settlement trees unless there are public health and safety issues. See response to comment 89-50.
John, Drew	Large trees are particularly precious inasmuch as they represent the 'future old growth' necessary to restore the forests of eastern Arizona to an ecologically sustainable condition, and to provide habitat to dense and high canopy dependent species. The old growth 'allocation' requirement of 20% in the forest plan, as discussed in the previous section Old Growth, is a 'paper' allocation and should not be confused with the 'actual' old growth that exists in the lower single digit percentage across the forests, numerically far below the required 20% - or even 10% - and temporally far removed from reaching the required 20%. The deficit of actual vegetative structural stage (VSS) 6 Old Forest is what makes vegetative structural stage (VSS) 4 and 5 Mid-age Forest and Mature Forest important. This reasoning guided Graham County when it participated to the stakeholders development of the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) that the USFS 4FRI Team adapted into two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Old Trees Implementation Plan (LTIP) is discussed in the previous section Old Growth. The purpose of the stakeholders' large trees retention strategy is to emphasize the retention of large trees (VSS 4 and 5) in order to re-establish the old growth necessary for the ecological sustainability of eastern Arizona forests. However, the large trees retention strategy also includes a series of exception mechanisms that codify the socially acceptable removal of large trees (VSS 4 and	(89-52) The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape." Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component"□. In response to

5) with a diameter superior to 16" at breast height (d.b.h.), when their removal is necessary to achieve the ecological restoration objective, to increase heterogeneity, and/or to conserve biodiversity. The stakeholders' document also includes provisions for collaborative adaptive management and collaborative participation to propose decision content, while complying with the statutory retention of the decision making authority by the Responsible Official. Graham County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) i) does not fully reflect the intent of the stakeholders; and, ii) does not take advantage of the products of the 4FRI collaboration. Specifically: 1. The Forest Service determined that: "The original LTRS did not provide the ability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings category" (DEIS p. 57). In so stating, the Forest Service apparently overlooks the fact that removal of individual large young trees is allowed under the exception mechanism, as required to meet the ecological restoration objective. The stakeholders' intent in constraining the removal of groups of large young trees is to allow the development of future old growth as required in the forest plans, including old growth groups. 2. The Forest Service further determined that: "this would result in a continued imbalance of size classes that would be contrary to the forest plan desired conditions" (DEIS p. 57). In so stating, the Forest Service fails to capitalize on the fact that the 4FRI DEIS already includes several forest plans amendments and that these amendments can address this issue as well. Further, the USFS 4FRI Team does not disclose at what scale the imbalance would occur. Imbalance at group level, or even possibly at stand level, becomes balance at larger scales as groups of VSS 5 future old growth balance large areas devoid of them. 3. The Forest Service also determined that: "The original LTRS would have required the Forest Service to consult with stakeholders should a new exception category be found during implementation (LTRS, page 25). To resolve the potential for Federal Advisory Committee Act (FACA) violations, this consultation requirement was removed" (DEIS p. 57). In so stating, the Forest Service misses an opportunity to take

comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. See our previous response regarding the large tree retention strategy and alternatives considered but eliminated that addressed diameter limitations as a means to conserve large trees.

	advantage of the MOU signed between the USFS and the stakeholders to address specifically such issues through collaboration in compliance with FACA. Therefore, Graham County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) is likely to be a significant social license risk for the 4FRI DEIS, and that the risk / benefits analysis of the social license risk vs. the restoration benefits may be unfavorable to 4FRI. Consequently, Graham County is concerned that the social license risk for the 4FRI DEIS likely caused by the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP), presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Graham County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2. Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during implementation; and, 3. Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale	
John, Drew	analysis not address the issue of continued imbalance of size classes.	(89-53) Please see our previous responses.
	Graham County observes that there are only a mere 5 instances of the word "prioritization" in the 744 page 4FRI DEIS. The County further observes that none of these instances apply to the discussion of the concept of treatments prioritization, for the obvious reason that there is no discussion of treatments prioritization in the 4FRI DEIS, including in Appendix D Alternative B through D Implementation Plan, or in the specialist reports or in the project record. Graham County also observes that Appendix D Alternative B through D Implementation Plan contains no discussion of timing or sequencing of treatments and that the concept of 'Implementation	
John, Drew	Plan' seems interpreted in the 4FRI DEIS as 'guidelines to implement'	(89-54) Recommendations that included sequencing were categorized as outside the scope of this analysis. The disclosure of sequencing within a NEPA document would be problematic because it would bind the Agency to a fixed schedule that may be unattainable due to weather, fires, markets, or other unforeseen circumstances. It would likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS does not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation is most appropriately

rather than ‘action plan to implement’ or ‘work plan to implement.’ The County certainly realizes that minute details of implementation are not a NEPA concern but a contracting management concern. However, the County also posits that the implementation of a management action as far reaching in scope and temporal and geographical scale as 4FRI, requires a discussion of timing and sequencing, inasmuch as timing and sequencing of treatments are of a nature to potentially impact significantly the site specific effects of individual treatments and the collective cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects). Further, the concept of ‘Strategic Placement’ of the treatments, in relation to values to be protected, dominant winds, modeled fire behaviors, etc., is critical in the determination of what treatments are most appropriate, how many treatments are required, what treatment intensities are required, and what is the best distribution between treatment types (mechanical vs. fire). The 4FRI stakeholders worked extensively to produce the Landscape Restoration Strategy for the First Analysis Area (2010) that addressed in detail the concept of geographical and temporal prioritization. This work was further refined with the participation of the USFS 4FRI Team into a classification of High Resource Values (HRVs) and Medium Resource Values (MRVs). Some elements of this work were utilized by the USFS 4FRI Team in the 4FRI analysis process, but the discussion of strategic placement; geographical and temporal prioritization; and, their impact on: number, type, intensity, individual and cumulated effects of treatments, is missing. Graham County is not inferring the need to re-analyze the location of the treatments. The County is generally satisfied with the map of treatments location. However, because the timely implementation of the restoration treatments is critical to meeting the purpose and needs of the proposed action, the County is concerned that the spatial and temporal sequencing of the treatments may have a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Therefore, the absence in the 4FRI DEIS of

addressed in implementation and operations. Recommendations that included strategic placement of treatments were categorized as being outside the scope of the analysis and not in alignment with the purpose and need for the project. Treating only strategic locations is a strategy used for hazardous fuels treatments when the primary objective is to modify fire behavior and to reduce high severity fire effects. In ponderosa pine, there is an overlap between hazardous fuel treatments and restoration treatments because restoring ponderosa pine forests generally results in reducing the severity of potential fire effects. Fuel treatments can include such strategies as thinning from below or leaving a minimum distance between tree crowns or boles. Neither of these would put a ponderosa pine forest on a trajectory towards health and resilience. The treatments displayed in the DEIS (alternative C, preferred alternative) and FEIS are designed to put the landscape on a trajectory towards the desired condition by treating the entire landscape, not just "strategically" placed treatments. Additionally, on a landscape the size of the 4FRI, it would be a gamble to guess where a fire might start, and the variables would be too numerous to make such an assessment valid.

spatial and temporal strategic timing and sequencing of the treatments, and integration of the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI EIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a discussion of strategic placement, spatial and temporal prioritization, and their influence on the number, type, intensity, and individual and cumulated effects of treatments, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Graham County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting a temporal prioritization of the treatments and a sequenced timeline of implementation for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; 2. Presenting a spatial prioritization of the treatments and the sequenced locations of the treatments, for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; and, 3. Presenting how the temporal and spatial prioritization affect the number of treatments, type of treatments, intensity of treatments, direct, indirect, site specific, and cumulated

John, Drew effects of the treatments.

(89-55) See previous responses. We recommend the counties continue to work with the forests and the monitoring and adaptive management group during implementation.

Fire behavior modeling is a critical part of the 4FRI site specific and cumulative analysis process, and Graham County appreciates the fact that a major effort was made along the entire 4FRI analysis process, starting well before the DEIS, or even the Proposed Action, to model the cumulative effects of landscape scale restoration treatments on fire behavior. To the County, post-treatments and long term future desired conditions fire behaviors represent much of the 'end game' in 4FRI, as the restoration of a natural regime of regular cool surface fires is fundamental to the long term ecological sustainability of the forests of eastern Arizona. Probably as a consequence of the fact that the 4FRI DEIS does not include a specific treatments implementation plan including timing, prioritization and sequencing of treatments in Appendix D Alternative B through D Implementation

John, Drew Plan (see section Prioritization here above), the fire behavior

(89-56) Page 15 to page 25 of the fire ecology report prepared for the DEIS outlines methodology and modeling used to support the fire analysis. For example, the fire report states, "Fire behavior for existing conditions was modeled for the project area using default Landfire Refresh 08 data. Results were reviewed by local fire experts (district, forest, National Park Service and non-federal firefighters and managers), and adjustments made to improve model accuracy. The process was repeated to further improve results. Fire behavior for post-treatment conditions was modeled using FlamMap and a combination of Landfire Refresh 2008 data and FVS-FFE data (LANDFIRE 2010a, LANDFIRE2010b). Post-treatment canopy characteristics and fuel loading were determined using the Fire and Fuels Extension (FFE) (Reinhardt and Crookston 2003) to the Forest Vegetation Simulator, FVS (Dixon 2002). In fire modeling, outputs (such as fire type and fireline

	modeling in the 4FRI DEIS only provides a theoretical modeling based on the unrealistic premise that all treatments would happen simultaneously. This is unfortunate because the fire behavior modeling cannot include accurate canopy characteristics (base height, bulk density and cover) or surface fuel loading for any given large area at any given point in time as a result of some treatments being implemented; some treatments not being implemented yet, with fuel load further increasing and canopy characteristics further degrading; and, some treatments having been implemented, possibly as earlier as a decade earlier, with canopy and fuel loading characteristics at various stages of regrowth. Accordingly, Graham County is concerned that post-treatment fire behavior as modeled may not represent reality, and that the analysis of the cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects) may be tainted. Therefore, Graham County is concerned that the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, due to the lack of timing and sequencing of the treatments, may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	intensity) are determined, in part, by the fuel models used. Post treatment fuel models need to take into account changes in total fuel loading and fuel structure. Landfire data must be manipulated to produce post-treatment conditions for fire modeling, so outputs from FFE were used to develop post-treatment fuel models. The modeled post-treatment fire behavior data are the result of combined stand data from the Forest Vegetation Simulator (FVS) and Landfire Refresh 2008 data. Post-treatment fire type was modeled by using outputs from FVS-FFE to adjust the percent of change to canopy characteristics and surface fuel loading and to inform the assignation of post-treatment fuel models. Details of the process for assigning post-treatment fuel models for modeling fire type is included in Appendix D. FVS outputs used were stand averages that were used to give a general idea of what stand conditions would look like, but could not address the spatial distribution of specific metrics on the same scale as the Landfire data. Landfire/FlamMap data are gridded (raster) data, with a resolution of 30 meters. FVS/FFE data is vector based, with smallest units being the size of individual stands. The 'hills and valleys' of the stand characteristics were smoothed out when the stand data were averaged, resulting in the fire behavior also being 'smoothed out' somewhat. A stand is 'typed' as a single vegetation type, though it may have a mix, for example, of pine forest and grassy openings. Habitat types (e.g. core areas, restricted habitat, etc.) were classified at the stand level to facilitate silvicultural analysis. Fire behavior was modeled at the 30 meter scale. The resolution for modeled fire behavior is 30 meters". The cumulative effects analysis for all alternatives is located on pages 227 to 249. Pages 18-23 of the fire ecology report specifically discuss methodology for evaluating canopy characteristics and fuel loading. Pages 23 to 25 display data sources and models. Appendix D of the fire ecology report (pp. 283-321) is titled, "Descriptions of models and processes used in fire modeling". Appendix D not only includes information on how the model was used but also discusses limitations associated with specific models.
John, Drew	Graham County respectfully suggests that subsequent to the completion of an analysis presenting a temporal and spatial prioritization of the treatments, the USFS 4FRI Team provide a clear and compelling analysis of the effects of the treatments on fire	(89-57) Please see previous responses concerning prioritization and fire modeling. In summary, It is not feasible to segment the NEPA analysis based on arbitrary prioritization assumptions that may or may not occur.

	behavior, presenting annual or bi-annual fire behavior modeling based on the outcome of the progressive implementation of 30,000 acres of restoration treatments annually over the 10 year life of the 4FRI project, and that the impact of this analysis be integrated in the analysis of the number, type and intensity of treatments required to meet the purpose and needs, and the direct, indirect, site specific, and cumulated effects of the treatments. The ponderosa pine vegetation type in the 4FRI DEIS analysis area is dominated by Class 2 functional at-risk 6th level Hydrologic Unit Code (HUC) watersheds on about 451,500 acres or 46 % of the analysis area. Class 3 impaired watersheds represent about 316,800 acres, or about 32 % of the analysis area. Class 1 properly functioning watersheds represent about 220,400 acres, or about 22 % of the analysis area (DEIS p. 107). Per the Specialist report, and as summarized in the 4FRI DEIS, the 4FRI restoration treatments under Alternative B (the Proposed Action) and Alternative C (the Preferred Alternative) are expected to result in an improvement in 23% of Class 2 functioning at-risk watersheds (~104,000 acres), and 42% of Class 3 impaired watersheds (~133,000 acres), with 28 miles of improved water flow regimes overall, including 19 miles in Class 2 watersheds that are functioning at risk and 9 miles in Class 3 watersheds currently impaired (DEIS p. 114). Graham County is generally satisfied that the effects of the 4FRI restoration treatments under Alternative B and Alternative C contribute significantly toward the County's objectives as expressed in its plans and policies and in these	
John, Drew	comments.	(89-58) Thank you for your comment.
John, Drew	Graham County encourages the USFS 4FRI Team to prioritize wherever and whenever possible restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures.	(89-59) See our previous response. Treatments in at-risk watersheds are a high priority.
John, Drew	During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Graham County observed that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Additionally, the site specificity verification process revealed that	(89-60) During this process (from scoping to DEIS to FEIS), no one has asked for the complete project record, including ECO. Throughout this entire process, we have openly shared our GIS data. It appears to have been usable to those with geospatial technology skills for a particular resource such as wildlife, silviculture and fire. We believe the project record, including all supporting data, has been included. We would welcome you pointing out to us what supporting data or information is

	some of the required Geographic Information System (GIS) data tables or layers were not entered into the official project record. Therefore, Graham County is concerned that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data and may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Graham County respectfully suggests that the USFS 4FRI Team conduct a systemic and systematic review of all technical data, GIS or other, used in their analysis, and ensures that it is included in the 4FRI project record. The County further suggests that the USFS 4FRI Team use the same methodology of random sampling as used by the DEIS Review Workgroup of the 4FRI Stakeholders Group to statistically verify that all required data is included in the project	missing in our project record.
John, Drew	record. During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Graham County verified to its satisfaction that the required site specificity as regards current condition, desired future condition, prescribed treatment, and site specific effects has been provided in the USFS 4FRI Team analysis process. However, as stated in the above section Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS, the site specificity verification process with the USFS 4FRI Team evidenced to both the County and the USFS 4FRI Team that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Therefore, Graham County is concerned that the difficulty to access site specificity information may present a process risk for the 4FRI DEIS.	(89-61) Please see the response to #89-60. (89-62) Regarding site specificity, the DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by
John, Drew	Consequently, Graham County is concerned that the possible process	

risk for the 4FRI DEIS potentially caused by the difficulty to access site specificity information, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions" (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated)

approving official" (DEIS, page 601). The site-specificity of the analysis was tested by the 4FRI stakeholder group. In response to comments on the DEIS, the stakeholder's wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue (4FRI Stakeholder, 2013 Cara Letter #155). See our previous responses which address the inclusiveness of project record documentation.

John, Drew	As discussed by the Eastern Arizona Counties Organization with the USFS 4FRI Team, Graham County respectfully suggests that the interactive map presented on the 4FRI DEIS website be developed to allow easy 'point and click' access to site specific information such as, but not limited to, current condition, desired future condition, prescribed treatment, site specific direct and indirect effects, and contribution to cumulative effects, as well as all the technical information regarding all relevant resources as can be conveniently provided. Alternatively, if technical or resource constraints preclude the USFS 4FRI Team to develop the above suggested interactive map, or to make it available to the public, Graham County respectfully suggests that a 'point and click' function could provide information on how to procure the desired site specific data from the project record.	(89-63) The interactive map is designed to provide people with an alternative method of reviewing maps and alternatives than the traditional poster-sized hard copy. People may still review the project record index and request documents (if not considered to be sensitive information, such has heritage site locations).
John, Drew	Appendix F Cumulative Effects includes a comprehensive list of the past, current and reasonably foreseeable future projects and disturbances included in the cumulative analysis. These projects and disturbances include vegetation projects (mechanical thinning and prescribed fires); recreation projects; other projects; wildfires; insect and disease outbreaks; and, a short discussion of reasonably foreseeable projects with insufficient information for analysis. The	(89-64) In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion.

list includes projects located on private, State, national forests and other federally managed lands that lie within, adjacent to and outside of the project area. Appendix F Cumulative Effects does not include a discussion of what the cumulative effects of all the projects are, and only includes a brief synopsis of Authorized Livestock Management; Timber Harvest; and, Post-1996 Vegetation Treatments – Uneven-aged Management, Fire Risk, Restoration, summarized from the Specialists' reports.

The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. In the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and ongoing projects by the FS and identified each project by National Forest and Ranger District. Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 - 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 - 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 - 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321).The above actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects

		analysis for MSO was revised. The FEIS wildlife report states "Because of the size of the 4FRI analysis area and the large portion of the western UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects" (Wildlife Report, page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers. comm. 2006). Wildlife habitat in the form of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, table, 153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page 400 to page 412 of the wildlife report. Similar to MSO, the goshawk cumulative effects analysis has been revised since the DEIS was published, see the FEIS, chapter 3.
John, Drew	Chapter 3 Affected Environment and Environmental Consequences addresses extensively the concept of cumulative effects on Soils and	(89-65) Thank you for your comment. For past actions, the cumulative effects analysis must be consistent with 36 CFR 220.4(f). This regulation

	Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; and, Transportation. However, the format used to discuss the cumulative effects varies considerably from resource to resource. For example, the Soils and Watershed (DEIS p.105-121) and the Terrestrial and Semiaquatic Wildlife and Plants (DEIS p.173-245) sections include fairly comprehensive descriptions of the cumulative effects and of their rationale. Other sections formulate cumulative effects as opinions, or as summary statements that essentially posit that the past or current projects have achieved or are achieving their stated objectives.	incorporates direction from 40 CFR 1508.7 and The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005). FSH 1909.15.3 provides specific direction on determining the spatial and temporal boundaries, two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial boundaries define the affected area for each resource indicator. Affected areas can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. “For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political" (FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose. Regarding the content of the cumulative effects analysis, please see our response to comment 89-64.
John, Drew	The Cumulative Effects section itself of Chapter 3 is but a two sentence paragraph that states: “A summary of past, present, and reasonably foreseeable management actions and natural disturbances that were evaluated by most resources is located in appendix F. See the project record for the comprehensive master list of all projects and for additional information on each project” (DEIS p. 331). Graham County is generally satisfied that the list of projects considered in the cumulative effect analysis is appropriate, with one notable exception. Since the completion of the 4FRI DEIS, the Flagstaff Watershed Protection Project Proposed Action (PA) has been released (April 2013) and will need to be integrated into the cumulative analysis in the final EIS.	(89-66) Chapter 2 of the FEIS notes that 4FRI treatment acres overlapping with the Flagstaff Watershed Protection Project have been removed from the 4FRI FEIS analysis. See our response to comment 89-64 and 89-65 for a general discussion on cumulative effects.
John, Drew	Graham County is generally satisfied that the resource specialists have conducted some form of cumulative effects analysis, and the County realizes that the cumulative effect analysis methodology cannot be identical across resources. However, the County is	(89-67) Please see our previous responses.

	concerned that the methodologies for cumulative effects analysis are generally not satisfactorily explained, and may be inconsistent in depth and breadth across resources. The County is further concerned that the issue of continuity between the project record, the specialists reports, and the DEIS - already identified regarding site specific effects -may also exist regarding cumulative effects. Therefore, Graham County is concerned that potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Graham County respectfully suggests that the USFS 4FRI Team include the Flagstaff Watershed Protection Project Proposed Action (April 2013) in the cumulative analysis in the final EIS. Graham County further respectfully suggests that each resource section of Chapter 3 Affected Environment and Environmental Consequences include a methodology subsection describing the methodology used for cumulative effects analysis. The County also suggests that the USFS 4FRI Team review methodologies across resources to ensure consistency of depth and breadth of cumulative effects analysis.	
John, Drew	Appendix E Alternative B through D Monitoring and Adaptive Management Plan offers brief one or two sentence descriptions of: types of monitoring (ecological, implementation, effectiveness, validation and Collaborative Forest Landscape Restoration Act (CFLRA)); monitoring prioritization, scales, question and indicators; and, a ten line description of adaptive management. Appendix E also includes Table 143 Implementation monitoring questions, indicators, frequency of measurement, data source, and cost; Table 144 Landscape-scale effectiveness desired conditions, indicators, frequency of measurement, data source, and cost; and, Table 145 Effectiveness monitoring plan. However, Graham County observes	(89-69) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol

that about half of Table 143 Implementation Monitoring is left blank, and for most questions for which the table is not blank, the indicators are crude and the frequency is minimal (typically: annual acres and miles). Table 143 looks more like an annual budgetary reporting table than a project implementation monitoring plan. The quantitative aspect of implementation monitoring seems addressed but the qualitative aspect of implementation monitoring seems largely unaddressed or unanswered. It is surprising that half the table is incomplete, indicating an unfinished product. Graham County also observes that Table 142 Monitoring scales, is left incomplete inasmuch as it does not include any monitoring scale below the sub-unit for the 4FRI DEIS. This, too, indicates an unfinished product. Further, there appears to be a gap in the effectiveness monitoring plan inasmuch as most of the treatments focus on achieving treatments objectives and desired conditions at the stand or even group level, while most of the effectiveness monitoring appears to be planned at the landscape scale. Graham County further observes that Table 144 Landscape-scale Effectiveness offers a fairly comprehensive list of desired future conditions: Conservation of Biological Diversity; Ecosystem Resilience; Water and Air Resources; Economics; Social Systems; and, Heritage Resources. However, the indicators listed are macro level indicators and the frequency of measurement is generally annually or every 5 years, and many sections of the table in the “Data Source/Spatial Scale/Cost” column indicate “No numbers provided.” This further indicates an unfinished product.

includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. County comments imply the need for a supplemental EIS because the monitoring plan was not complete. In response to comments on the DEIS an agency may: (1) Modify alternatives including the proposed action, (2) Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan. As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the Adaptive Management section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in

		how the plan questions and indicators are organized and change section name to "Monitoring: Desired Conditions, Indicators, Thresholds and Triggers"□, (6) Modified the "Monitoring Prioritization"□ section to reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and changed section name to "Prioritization - Monitoring Tiers"□; and (7) Modified the "Monitoring Scale"□ section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix B) informed people that the monitoring plan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species"□ section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation"□ section) and the development of the implementation plan (appendix D).
John, Drew	Graham County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more of an adaptive management decision matrix than an effectiveness monitoring plan. Adaptive management is addressed in the following section Adaptive Management.	(69-70) Thank you for your observation.
John, Drew	Graham County is concerned that the 4FRI DEIS, the Specialists reports and the project record do not include a specific 'action plan' or 'work plan' and budget, or funding mechanisms, for the monitoring plan. Although the question of who will monitor, and potential funding sources, are nominally mentioned in Table 141 Monitoring plan tiers, the scale, scope and complexity of 4FRI require addressing these questions in a comprehensive fashion that goes well beyond a passing mention in Table 141. How many man-hours will the implementation of the monitoring plan require? Who will provide these man-hours? How much will it cost? How will it be funded? What are the quality control mechanisms to ensure that monitoring itself - if provided by volunteer (amateur?) third parties - meets required criteria? What mechanisms exist to ensure the integrity of the measures? Further, the reliance on "stakeholders"	(89-71) Thank you for your comment. A project work plan is developed each year once the Agency receives its budget as appropriated by Congress. Once the annual budget is available, the Forest Service will work with the Multi-Party Monitoring Board to prioritize monitoring activities. All of these questions will be answered in collaboration with the Multi-Party Monitoring Board as set forth in the collaboratively developed AMMP. These determinations cannot be made until we know more about the available annual budget, the funds that can be leveraged by partners, and the specific monitoring protocols developed by the Forest Service and the monitoring board. The Forest Service will continue to consider new peer-reviewed science as it becomes available. The collection of monitoring data through a third party would be coordinated by the multi-party monitoring board in collaboration with the Forest Service. Once the data is delivered, it will be verified

and “multiparty (monitoring boards)” in the 4FRI DEIS monitoring plan tiers (Table 141, DEIS p. 660) raises questions which are left unanswered regarding the functioning of the monitoring plan. For example: What is the USFS mechanism to utilize third party developed monitoring data to make agency action adaptive management decisions? What are the mechanisms to deal with adaptive management decisions that may be of a nature to significantly alter the management actions identified in the Record of Decision? Etc.

Graham County is further concerned that the ability of the public to review and comment on the 4FRI monitoring ‘action plan’ or ‘work plan’ and budget has been compromised inasmuch as even if the USFS 4FRI Team develops such a plan and budget as an outcome of the comments process, the plan will not be available for public review and comments until a notice of decision is published, unless the USFS 4FRI Team decides to release a second 4FRI Draft EIS (DEIS) or a Supplemental EIS (SEIS). Considering that the 4FRI monitoring ‘action plan’ or ‘work plan’ and budget currently do not exist, it is not possible to submit substantive comments on them and, therefore, a potential objection could be ineligible based on 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments.

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and evaluated through by an interdisciplinary team of resource specialists. The results of the evaluation and the implications of potential adaptive management actions will be provided to the deciding official for a final decision. If monitoring indicates that the environmental effects of each action do not exceed the bounds of those disclosed in the environmental document, and the actions serve to move the project towards the desired conditions, the Forest service can continue implementation as described without the need for new or supplemental NEPA review (FSH 1909.15, 54.1). However, if monitoring indicates that the project is not moving towards the desired condition, the Forest Service will first evaluate design adjustments within the bounds of the management actions already disclosed and analyzed in the environmental document. For example, if the Forest Service were modifying the vegetation within an area according to treatment type UEA25, we may reduce the area occupied by interspace to 25 percent; rather than the maximum allowable of 40 percent. In both cases, the treatment type is the same, but the design change may better move the projects towards the desired condition. "In the case that new information or changed circumstances result in environmental impacts of a proposed action not disclosed or analyzed, further interdisciplinary review should occur as described in section 18"□ (FSH 1909.15, 54.1). (89-72) Thank you for your comments; they have been noted. See previous responses on budget and responses on the completeness of the information provided to the public in the DEIS on monitoring. The monitoring and adaptive management plan was developed in collaboration with stakeholders. Enough information was provided in the DEIS (DEIS Appendix E) to inform the public. Sufficient information was included because many comments were received on the plan, including the need to incorporate the MSO monitoring plan. That document was unavailable at the time the DEIS was released for public comment because it was derived from the FWS biological opinion. However, 36 CFR 218.8 does address new information that was provided to the public after a comment period has been provided, "(c) Issues raised in objections must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector, unless the issue is based on new information that arose after the opportunities for comment". While

John, Drew	In contrast, the current Forest Service Manual requirements for Plan Monitoring Program Design (Sec. 1921.51) are extremely specific: “In designing the plan monitoring program, the Responsible Official: 1. Should consider ongoing project and activity monitoring. 2. Should establish and apply a screening process (FSH 1909.12, section 12.1) to ensure that only feasible and meaningful monitoring activities are conducted, and in a manner that is practical and affordable. 3. Should store and manage monitoring data in corporate applications such as Natural Resource Information System whenever the capability exists. 4. Should develop a multi-year monitoring guide that describes protocols, databases, and a monitoring schedule. 5. Shall develop an annual monitoring action or work plan to identify the specific monitoring tasks to be accomplished and the budget and personnel associated with those tasks.” Graham County fully understands that Sec. 1921.51 was initially written to apply at Forest Plan level, and that the 4FRI DEIS is nested at project level within the Coconino and Kaibab forest plans. However, CEQ has made very clear that when mitigation is involved in the NEPA analysis – such as the adaptive management mechanism integrated within the 4FRI DEIS – monitoring is automatically invoked. Therefore, Graham County is concerned that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular; that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised; and, therefore, the 4FRI Monitoring Plan may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular, and that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised, presents a consistency gap between the 4FRI DEIS and	there have been updates to the analysis since the DEIS was made available for public comment, the changes from DEIS to FEIS are insignificant or in response to public comments on the DEIS (allowed by CEQ). There is no need for a supplemental DEIS. (89-73) As you state, the Plan Monitoring Program Design referenced in this comment applies to Land Management Planning (i.e. Forest Plans) and not to project monitoring. Furthermore, "CEQ recognizes that it may not be possible to identify fund from future budgets; however, a commitment to seek funding is considered essential and if it is reasonably foreseeable that fund for implementation of mitigations may be unavailable at any time during the life of the project, the agency should disclose in the EA or EIS the possible lack of funding and assess the resultant environmental effects" (CEQ Memorandum 2011). The Forest Service commits to using a portion of its annual funding for monitoring and both the Forest Service and the 4FRI stakeholder groups have committed to seeking additional funds. The updated AMMP clearly states that "budget limitations dictate how much and what type of monitoring can be accomplished. In order to prioritize what monitoring will be accomplished, this plan provides a tiered system for prioritizing monitoring" (DEIS Appendix E). CEQ guidance also provides that "agencies have discretion, within the scope of their authority, to select an appropriate form and method for monitoring" and "possible monitoring methods include agency-specific environmental monitoring, compliance assessment, auditing systems" (CEQ memorandum 2011). The AMMP was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to

the County's objectives as expressed in its plans and policies and in these comments.

Graham County respectfully suggests that the USFS 4FRI Team include in very specific terms: i) quantitative, qualitative and effectiveness monitoring processes; ii) a monitoring 'action plan' or 'work plan' and budget; and, iii) the resources allocation and funding necessary to implement monitoring in the 4FRI DEIS, to ensure that the monitoring of the 4FRI project implementation is quantifiably and qualitatively implemented. Practically, Graham County suggests a three step monitoring process articulated as follows: 1) Quantitative implementation compliance monitoring. The purpose of the quantitative implementation compliance monitoring is to answer the question: "Was the job done?" While, generally, this assessment is made by the Forest Service contract management team when a contractor is involved, it is suggested that this step becomes the beginning of the process rather than what is often the end of it. Specific quantitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 2) Qualitative implementation compliance monitoring. The purpose of the qualitative implementation compliance monitoring is to answer the question: "Was the job done correctly?" The need for qualitative implementation monitoring increases rapidly with the complexity of the actions undertaken. Complex forest restoration prescriptions implemented using designation by description (DxD) or designation by prescription (DxP) create substantial room for interpretation by the operators, and may result in outcomes substantially different on the ground from those intended by the resources specialists who wrote the prescriptions. Verifying that implementation complies not only quantitatively but qualitatively with the management decision is especially important when the third

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expand the scope of our monitoring efforts. Interested parties may scrutinize the updated monitoring plan and continue to comment. This may occur during the objection period which is designed to allow discussions between the FS and interested parties to explore any changes to the proposed actions. This discussion occurs before the Record of Decision is signed that authorizes project implementation. (89-74) The DEIS identifies design features and mitigation by resource that would apply to any of the action alternatives (DEIS, Appendix C, Table 111, page 565 to page 599). Appendix D of the DEIS states, "This implementation plan is designed tube integral to the selected alternative and record of decision (ROD). The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Table 112 to table 115 is checklists designed to monitor compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is also the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions"□ (DEIS, page 601). Furthermore, appendix E of the FEIS provides a plan for not only additional implementation and compliance monitoring, but also effectiveness monitoring. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As

step of monitoring is intended, as effectiveness can only be meaningfully analyzed if the actual treatments outcomes are in compliance with the intended outcomes. Specific qualitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 3) Multi-tier and multiple scales effectiveness monitoring. The purpose of the effectiveness monitoring is to answer the question: "Do the outcomes of the management decision produce the intended effects?" The need for effectiveness monitoring increases rapidly with the complexity and spatial and temporal scopes of the management actions undertaken, especially in projects where cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions. Landscape scale forest restoration over 2 million acres in 20 years, as endeavored in the 4FRI project, is largely inconceivable without the concept of adaptive management. However, adaptive management is but an empty rhetoric, and any management action and the NEPA analysis thereof is flawed if robust three step monitoring as described here above is not planned and implemented. Specific effectiveness monitoring processes can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. A three functional steps monitoring process articulated as above can be easily adapted to the three priority tiers identified in the 4FRI stakeholders suggested monitoring plan (2012) and the three monitoring scales identified in Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 660). In presenting the above monitoring process, Graham County does not intend to propose an alternative to the stakeholders developed Biophysical and Socioeconomic Monitoring for the Desired Conditions of the Four Forest Restoration Initiative plan, but to suggest a framework for the associated monitoring 'action plan' or 'work plan' and budget required under FSM Sec. 1921.51 (4) & (5).

such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively work with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols. The multi-party monitoring board is developed independently within the stakeholder group. If provided prior to publication, a stakeholder developed document outlining the structure of the board can be included in an appendix to the FEIS. As outlined in the collaboratively developed adaptive management and monitoring plan, the multi-party monitoring board will work with the USFS, where appropriate, to oversee monitoring prioritization, implementation, data storage and assessment. Furthermore, the plan states that the stakeholder group (and by association, the monitoring board) will provide adaptive management recommendations to the Forest Service based on the monitoring information collected. As you state, the Plan Monitoring Program Design referenced in this comment applies to Land Management Planning (i.e. Forest Plans) and not to project monitoring. Furthermore, "CEQ recognizes that it may not be possible to identify fund from future budgets; however, a commitment to seek funding is considered essential and if it is reasonably foreseeable that fund for implementation of mitigations may be unavailable at any time during the life of the project, the agency should disclose in the EA or EIS the possible lack of funding and asses the resultant environmental effects" (CEQ memorandum 2011). The Forest Service commits to using a portion of its annual funding for monitoring and both the Forest Service and the 4FRI stakeholder groups have committed to seeking additional funds. The updated AMMP clearly states that "budget limitations dictate how much and what type of monitoring can be accomplished. In order to prioritize what

Graham County respectfully suggests that the 4FRI DEIS include in very specific terms the requirements for the Responsible Officials to be bound by the findings of multi-party monitoring boards. It is not suggested here that responsible officials surrender their decision making authority to a multi-party monitoring board, or violates the requirements of FACA, but that they should be required to act upon the findings of a multi-party monitoring board in a manner that

John, Drew appropriately addresses the issues raised.

Graham County observes that the words 'adaptive management' are used in 61 distinct instances throughout the 4FRI DEIS, and that

John, Drew adaptive management is referred to, throughout the entire 4FRI

monitoring will be accomplished, this plan provides a tiered system for prioritizing monitoring (DEIS Appendix E). CEQ guidance also provides that "agencies have discretion, within the scope of their authority, to select an appropriate form and method for monitoring" and "possible monitoring methods include agency-specific environmental monitoring, compliance assessment, auditing systems (CEQ memorandum 2011). The AMMP was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Interested parties may scrutinize the updated monitoring plan and continue to comment. This may occur during the objection period which is designed to allow discussions between the FS and interested parties to explore any changes to the proposed actions. This discussion occurs before the Record of Decision is signed that authorizes project implementation.

(89-75) As described in appendix E (Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan, also known as the Adaptive Management and Monitoring Plan, or AMMP), the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. The deciding official will then consider potential adaptive management actions and make a final determination. However, the Government cannot surrender its decision making authority to the multi-party monitoring board.

(89-76) The comment refers to the 2012 Planning Rule; however, 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather

John, Drew	DEIS, as an integral part of the 4FRI project and as a management tool fully integrated in the 4FRI NEPA process. The County applauds the commitment of the USFS 4FRI Team to adaptive management, as projects on the scale of 4FRI (~2 million acres in 20 years), or even the first DEIS of 4FRI (~1 million acres in 10 years), where direct, indirect and cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions, are largely inconceivable without the concept of adaptive management. However, Graham County observes that aside from a five line description in the Glossary (DEIS p. 341), and a nine line general description in the Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 661-662), there is no presentation or description in the 4FRI DEIS, the specialists reports or the project record, of the adaptive management process. The entire adaptive management plan for the 4FRI project is described as follows: “Monitoring of alternative management actions provides the data for the adaptive management process. As a result of comparing monitoring results to the predicted outcomes, the plan provides a roadmap for adjusting actions or applying new science as long as the anticipated effects are within the scope of impacts analyzed and disclosed in the EIS and record of decision” (DEIS p. 661-662). The fundamental issues of characterization of system uncertainty through multi-model inference; definition of temporal and spatial scales; indicators selection; analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; identification of thresholds; evaluation of strategic alternatives; amplitude, timing, scale and iteration of corrective actions; etc., are left untouched. Additionally, as mentioned in the above section Monitoring, Graham County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more an attempt at an adaptive management decision matrix rather than an effectiveness monitoring plan per se. The table includes some indicators, triggers, and adaptive actions based on landscape scale desired conditions, but many adaptive actions applying to macro level desired conditions are “discontinue” or “prohibit until alternative approach is development (sic)” or “increase” or “re-evaluate”. These are binary	information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity". In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management. We agree that the site specific monitoring and adaptive management plan in the DEIS was incomplete. Please refer to Appendix E and the updated AMMP in the FEIS for a more detailed definition of the adaptive management process including clarifying figures and adaptive management activities proposed in response to threshold triggers. (89-77) Thank you for your observations. Please see previous responses.

or vague. In addition, many of the triggers timelines are 5 or even 10 years long, which may be adapted for some resources, but may not allow, for other resources, the identification of trends, and the implementation of adaptive management actions before the entire 4FRI project, or half of it, is completed. Similarly, the few lines of adaptive management narrative are vague and general: “Some of the effectiveness monitoring objectives have adaptive management actions that would be taken if the established thresholds are reached or exceeded. Alternatives B, C, and D have specific adaptive management actions for springs, channels, and roads that have been made part of the alternative (see DEIS chapter 2)” (DEIS p. 662). Graham County is concerned that adaptive management is only a concept at this stage; that the specialized techniques and processes of adaptive management may not be fully grasped; and that adaptive management has not been truly engineered into the 4FRI project as an executable management mechanism integral to the 10 year implementation of the 4FRI EIS over one million acres.

Further, Graham County is concerned by the reaction to date of the USFS 4FRI Team to such observations: “Adaptive management is not a NEPA requirement.” The County is concerned that, while it is correct that adaptive management is indeed not a NEPA requirement in the 1982 Planning Rule, it has become one under the 2012 Planning Rule (Forest Service Handbook FSH 1909.12 – 41). Maybe more importantly, the County is concerned that by making adaptive management a key process of the 4FRI NEPA analysis, the USFS 4FRI Team has in effect constrained itself into designing and implementing a true adaptive management process. Therefore, Graham County is concerned that the absence of a robust adaptive management process, despite the stated reliance on adaptive management to implement restoration treatments on one million acres over 10 years, may present a process risk for the 4FRI DEIS. Consequently, Graham County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a structured adaptive management plan, presents a consistency gap between the 4FRI DEIS and the County’s objectives as expressed in its plans and policies and in these comments.

John, Drew

(89-78) The comment refers to the 2012 Planning rule. Please see the response to #76-4 for information about the relevant rule planning rule under which the 4FRI was initiated. However, the 2012 Planning Rule at 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity"□. In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management. Thank you for your suggestions. The adaptive management and monitoring plan was developed in collaboration with stakeholder group through an open and public process. This process involved in-depth multi-party discussions on a wide range of socio-economic and ecological issues. Since its inception, the plan was intentionally designed to be a living document that will adapt over the course of the project as information is gained and new questions are revealed. In January of 2014, the current iteration of the adaptive management and monitoring plan was approved by the 4FRI

		stakeholder group for inclusion into the FEIS. Your participation in that process is appreciated. We feel that the plan is a robust and well thought out document that establishes the proper framework for the Forest Service to not only monitor the effects of restoration activities, but also adapt as new information is made available.
John, Drew	In its review of the proposed directives revising the Forest Service Handbook (FSH 1909.12) and the Forest Service Manual (FSM 1920), and establishing procedures and responsibilities for implementing the 2012 National Forest System Land Management Planning Regulation set out at 36 CFR part 219, Graham County identified issues and shortcomings that are likely to affect the 4FRI DEIS. Graham County fully understands that the opportunity to comment on the 4FRI DEIS is neither an opportunity to comment on the 2012 Planning Rule, nor on its implementation directives. Nonetheless, precisely because the 4FRI DEIS will establish the parameters for all subsequent management actions in the 4FRI project for the upcoming 10 years or more, the County believes that it is appropriate for the 4FRI EIS to specifically include and, therefore, integrate into any subsequent management action, guidelines on: i) how to use of best available scientific information to inform the land management planning process; ii) public participation and the role of collaboration; and, iii) the objection process.	(89-79) Please see the responses to the individual issues such as the use of best available science, public participation and the 36 CFR 218 objection process.
John, Drew	Graham County appreciates and supports the important role given to the use of best available scientific information to inform the land management planning process in the proposed directives and in the 4FRI DEIS. Graham County further appreciates and supports the important role given to assessing social and economic sustainability and multiple uses in the assessment process. Issue However, Graham County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials in actually integrating social and economic sustainability and multiple uses, and in integrating social and economic science to the framework of best available scientific information to inform their land management planning process, and their management decision making process. Specifically, the assessment of the social, cultural and economic values becomes essentially an exercise in futility if these values are not reflected in the management decisions, and do	(89-80) Thank you for expressing your opinion. Please see all previous responses.

	not balance other values. This lacking is reflected in the 4FRI DEIS. Graham County clearly supports robust science and the full integration of ecological, bio diversity, restoration and conservation values in the management process, and the County is on record for participating in, and often leading, efforts designed to re-introduce to the ecosystems of eastern Arizona natural ecologically sustainable processes such as a frequent cool surface fire regime. Nevertheless, the County is observing, and when necessary is committed to mitigate, a tendency to develop and implement pure, uncompromised and uncompromising science, or the currently accepted state of best science - which often proves to be a temporary state, to the detriment of the enjoyment, custom, culture, health, safety and economic well-being of the people. Additionally, Graham County is also observing, and when necessary is also committed to mitigate, the fact that the same temptation to develop and implement pure, uncompromised and uncompromising science, also often causes the weakening of the social consensus with stakeholders who would support the implementation of management decisions based on a balanced approach, but are unwilling to support the invasive implementation of a monolithic and intransigent interpretation of science. For example, many stakeholders are reluctant to support unconditionally the 4FRI DEIS, owing to the science-based decision to cut some of the large trees necessary for the development of the future old growth, in order to create regeneration openings in the name of scientifically driven silviculture. Such decisions may make sense at group level, in forests featuring well balanced classes of vegetative structural stages (VSS), but are difficult to support at stand level or forest level in forests where older VSS classes (VSS 5 and 6) are in recognized deficit at landscape scale, while younger VSS classes (VSS 2, 3 and 4) are overabundant, choke the landscape, and transform it into a ticking fire bomb. Graham County suggests that the 4FRI EIS provide clear and unambiguous guidelines to responsible officials to integrate social sustainability and social science into the framework of best available scientific information to inform their management decision making	
John, Drew	process. Specifically, Graham County suggests that the 4FRI EIS guide	(89-81) Thank you for expressing your opinion.

responsible officials to implement substantive - even though possibly scientifically imperfect - management actions that move the ecosystems significantly toward the desired future conditions, when such actions are supported by social consensus, rather than spend years attempting to forcibly impose management actions that may be deemed scientifically more perfect but that do not benefit from the support of the social consensus. In other words, the County suggests that the 4FRI EIS emphasize executing well less than perfect projects now, over developing scientifically perfect projects that are not implemented. To quote a famous Arizonan: "Extremism in the defense of liberty is no vice" (Barry Goldwater), but Graham County would like to propose to the USFS 4FRI Team that extremism in the pursuit of best available scientific information (BASI) may become counterproductive when it results in paralysis by analysis, or inaction by litigation.

Graham County appreciates and supports the important role given to public participation and the role of collaboration in the proposed directives and in the 4FRI DEIS. Issue However, Graham County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials on two fundamental and overlapping aspects of public participation and the role of collaboration. Specifically: i) sustained and meaningful public participation and engagement require that the public's input actually influence substantially the decision making process; and, ii) sustained and meaningful collaboration requires that the products of collaboration be honored by the Forest Service. This lacking is reflected in the 4FRI DEIS. Graham County has acquired a long, ineffective, inefficient, unproductive and oftentimes frustrating experience of responsible officials paying lip service to public participation and to the role of collaboration, and the County believes that the 4FRI EIS must focus the concept of public participation and collaboration away from complying with a process and 'managing the problem,' toward developing executable products and 'resolving the problem.'

John, Drew

(89-92) The 4FRI planning effort has lived up to the spirit of authentic collaboration since the inception of the idea to restore 2.4 million acres across northern Arizona. A working relationship was built with the stakeholder's group, and beginning in 2010, collaborative planning efforts include but are not limited to, the use of the stakeholder's Landscape Restoration Strategy to inform the purpose and need and proposed action for this project. In addition, the stakeholder's group produced the Large Tree Retention and Old Growth Protection Strategy which was used to inform alternatives and the modified version is incorporated in the project's implementation plan. The collaborative effort continues with the participation of the stakeholder group in developing the adaptive management and monitoring plan which is included in the FEIS. Evaluating monitoring information and data gathered about the ecological and socioeconomic components affected by restoration activities creates the feedback necessary for making any adaptive management decisions. As described in appendix E and the AMMP, the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. Because the Forest Service can neither abdicate its legal responsibilities nor delegate decision-making to the collaborative group, the deciding official will consider potential adaptive management actions and make a final determination. All collaborative

		decisions still need to move through procedures for agency evaluation and accountability.
John, Drew	Graham County recognizes that under current federal statutes Forest Service line officers are not allowed to share their decision making authority. Nonetheless, the County believes that a statutory monopoly of decision making authority does not necessarily imply an operational monopoly on decision content. Therefore, the County suggests that the 4FRI EIS emphasize that while the line officers retain their sole legal ability to make the decision, they are also required by law and regulation "to meet the needs of present and future generations" (Forest Service Mission Statement), as expressed through true public participation and collaboration, and meaningful consistency reviews with the local governments' objectives, among other channels. Graham County further suggests that the 4FRI EIS guide responsible officials in retaining their legal decision making authority while allowing the public to participate meaningfully in, influence substantially, and, when appropriate, contribute to alter the content of their decision.	(89-83) Please see the response to 89-82.
John, Drew	Graham County appreciates the attempt made by the Forest Service to: i) allow the public a more effective involvement; ii) support the collaborative processes; and, iii) develop better decision-making (U.S. Forest Service Chief Tom Tidwell) by replacing the previous appeal process with the new pre-decisional administrative review, or "objection process", to be applied under federal regulation to all projects and activities that implement land-management plans and that are documented in an environmental assessment or environmental impact statement. Graham County acknowledges that the U.S. Forest Service announced on March 26, 2013 the final rule governing the objection process for projects and activities implementing land-management plans, and that the final rule was published in the Federal Register on March 27, 2013 after a review of public comments submitted in response to the publication of the proposed rule in 2012. Consequently, the County fully understands that this comments letter is not an opportunity to comment on the objection process.	(89-84) Thank you for your comment.
John, Drew	However, Graham County believes that the recent decision made by the Forest Service to replace the previous appeal process with the	(89-85) Please see the response to #89-72.

	new objection process in the 4FRI NEPA process does provide an opportunity to address concerns about the objection process implementation, as follows. Among other significant differences, a critical difference between the previous appeal process and the new objection process is that an objection must be filed prior to an actual decision being made and published. This creates a potentially difficult situation inasmuch as there is a possibility, and in certain cases a probability, that several objections may be filed by several different parties, and that the resolution of these objections may result in a final decision significantly different from the one disclosed in the document published with the notice of a plan subject to objection. Although the list of objections will be public, the timing of filing of potential objections within the objections filing period may result in the requirement for the public to decide to file, or to abstain to file an objection based on the speculation of what other parties may decide to file, and what the resolutions to such objections might be. Additionally, since a final decision may be influenced significantly by the resolution of an objection that, by definition, happens only after the comments period is closed, parties may be unwillingly put in a situation where, per 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments, their potential objection may be ineligible. Additionally, Graham County is concerned that Chapter 50 Objection Process in general, section 51.66 - Reviewing Officer Response to Objections and section 51.6 - Resolution of Objections in particular, and specifically section 51.6 paragraph 4: "The reviewing officer responds to the outstanding issues in the objection; The reviewing officer's response may include instructions to the responsible official as part of the disposition of the objection. The response must be sent to the objecting party(ies) by certified mail, return receipt requested, and posted online" (36 CFR 219.57(b) and sec. 51.64) are focused on the administrative process of disposing of an objection, rather than on the substantial process of actually resolving it. Graham County suggests that the 4FRI EIS guide the reviewing officers to exercise careful judgment in their resolution or rejection of objections, in relation to the true material importance of the objections – as opposed to their symbolic or emotional importance,	
John, Drew		(89-86) Thank you for interest in and concern for this restoration project.

	and the potential effect of litigation on the implementation of the project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' objections, and the major benefits attached to sustaining the 4FRI social license. In so suggesting, Graham County wants to emphasize that it does not promote indiscriminate and aberrant acceptance of any and all parties' whims or irrational demands, but a well-considered costs and benefits analysis by Forest Service responsible officials, line officers and reviewing officers of public input in their decision process in view of the relative actual significance or lack thereof of such input, and the overwhelming urgency to act, even if imperfectly in some specific cases, such as the protection of the forests of eastern Arizona against catastrophic landscape scale wildfires. In summary, Graham County wants to re-state its overwhelming support for the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the suggestions provided by the County and other stakeholders integral to the sustainability of the 4FRI social license. Therefore, the concerns and suggestions provided by Graham County are not aimed at questioning the need to implement 4FRI, but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process that could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project, as intended by the County. Graham County is fully aware that per Sec. 1503.4 Response to comments, the USFS 4FRI Team may elect to "Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response" (Sub Sec. 5). However, this is not the expectation of the County. Rather, the County expects that the USFS 4FRI Team will receive the County's comments in the spirit of continuous improvement and risk mitigation in which they were written, and elect to "Modify alternatives including the proposed action" (Sub Sec. 1), and "Supplement, improve, or modify its analyses" (Sub Sec. 3) as allowed for under Sec. 1503.4. Graham	
John, Drew		(89-87) Your comments have been noted. Thank you for your involvement in the 4FRI DEIS comment process.

	County respectfully submits that the above comments and suggestions are substantive in nature and warrant careful consideration and adoption by the Forest Service. Graham County requests to be kept informed as the 4FRI NEPA process progress; hereby reserves its right to provide further comments as the process unfolds; and, requests that the Forest Service commit to receiving and integrating further comments from the County as provided. Graham County appreciates the opportunity to comment on the 4FRI DEIS and thanks the USFS 4FRI Team for this opportunity. The County is committed to partner with the U.S. Forest Service to meet the County's residents' and visitors' enjoyment, custom, culture, health, security and economic well-being needs. Graham County, therefore, understands particularly well the issues at hand, the management processes engaged, the desired future conditions, and the difficulties and challenges involved. The County appreciates fully the USFS 4FRI Team's intent to: i) ensure an adaptive management planning and implementation process that is inclusive, efficient, collaborative and science-based to promote healthy, resilient, diverse and productive national forests and grasslands; ii) support natural resources-based rural economic development and employment; and, iii) ensure the enjoyment of the 4FRI national forests by the current and future generations in a balanced approach of preservation, conservation and sustainable exploitation of the natural resources. In a spirit of continuous improvement, and based on the direct practitioner knowledge and experience gained through a uniquely long, diverse, often productive and sometimes difficult participation in the Forest Service planning and implementation processes, Graham County would like to share its comments, its appreciation for the obvious work put into the 4FRI DEIS, and its concerns and suggestions as follows.	
John, Drew	I have read about the changing of the forest growth by cutting and burning Ponderosa Pines. I support the keeping of Ponderosa Trees, as they are a tree that is beautiful, does well in dry conditions, provides "Tall Tree Shade", and habit for owls. I also love to camp under pines as the area is often clear of underbrush due to acidity of the soil. The sound of the wind in the pines and smell of the vanilla/butterscotch sap of ponderosa trees is also unique. Please do	(89-88) Thank you for the time and attention given to analyzing the 4FRI DEIS.
Kerr, Patrice		(170-1) Thank you for your comment. We would encourage you to read chapter 3 of the DEIS.

	not strip our forests of these trees!	
Krevit, Sheldon	This project is ill conceived. Who will benefit from this? Cut down the Ponderosa Pines for the profit of a few? Those pines don't just grow up overnight. They're some of the most majestic trees we're blessed with in this land. Destroy the habitat of the Mexican Spotted Owl? Why? This isn't forest restoration. It's forest destruction! Stop it now!	(142-1) Thank you for your comment.
Kuharsky, Merry	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan.	
Kuharsky, Merry	The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species.	
Kuharsky, Merry	The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape.	
Kuharsky, Merry	Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests.	
Kuwanwisi wma, Leigh	This letter is in response to the Draft Environmental Impact Statement for the Four Forest Initiative, Coconino and Kaibab National Forests regarding a proposal to conduct restoration activities within a 587,923 acres ponderosa pine ecosystem over 10 years_ The Hopi Tribe claims cultural affiliation to prehistoric cultural groups in Coconino, Kaibab, Apache Sitgreaves and Tonto National Forests. The Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites and we consider the prehistoric archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties. Therefore, we appreciate the Forest's continuing solicitation of our input and your efforts to address our concerns.	(12-1) Thank you for your continued interest in this project.
Kuwanwisi wma, Leigh	In the enclosed Jetter dated March 21, 2011, the Hopi Cultural Preservation Office reviewed the Four Forest Restoration Initiative-	(12-2) Appendix J of the Programmatic Agreement is integral to the project and has been included in the heritage resources report.

Kuwanwisiwma, Leigh	Coconino and Kaibab National Forest Purpose and Need and Proposed Action. We stated in initial consultations we have been informed that Appendix J, Standard Consultation Protocol for Large-Scale Fuels Reduction, Vegetation Treatment, and Habitat Improvement Projects pursuant to the First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities will apply to these projects. In the enclosed letter dated June 6, 2011 we reviewed the Heritage Resources Strategy and NEPA Compliance for the Four Forest Restoration Initiative. The Strategy states that 46% of the 530,187 acre project area in the Kaibab National Forest has been surveyed for cultural resources and 3,843 cultural resources have been identified, and 40% of the 817,151 acre project area in the Coconino National Forest has been surveyed and 3,366 cultural resources have been identified. The Strategy also states that Kaibab and Coconino National Forests have approached their methods of inventory in the ponderosa environments very differently, with the Kaibab conducting 100% survey and the Coconino conducting l 00% survey in high site density areas, but only sample surveys of around 15-25% in low density areas. We understand that this multiple forest survey strategy generally adopts the Appendix J and Coconino approach, and that this strategy is intended to result in a determination of no adverse effect to historic properties.	(12-3) Potential effects would be addressed through site avoidance strategies and implementing the site protection measures listed in Region 3 Programmatic Agreement (PA), Appendix J, and in the Heritage Strategy (Gifford 2011). There is the possibility that cultural resources would be discovered during project implementation. Discovery guidance is found in PA Appendix J. The Appendix J approach has been consulted on with the SHPO for this project.
Kuwanwisiwma, Leigh	In our June 6, 2011, letter we asked why the Forests don't adopt the approach Kaibab has employed since the 1970s, rather than the less rigorous Appendix J and Coconino approach to provide consistency in the way compliance is conducted. The Forest Service has acknowledged that the need to improve the health and condition of the forests has resulted from the fire suppression mismanagement of the forests over the last Century. If it has been possible for the Kaibab to conduct I 00% surveys for over forty years. is that approach now being diluted because of the sheer size of this proposal?	(12-4) Thank you for your comment. The Appendix J approach has been consulted on with the SHPO. The DEIS (Appendix B, page 572) and FEIS includes mitigation (HR/TR 1to 5) to ensure no effect or no adverse effect in consultation with SHPO and ACHP. Monitoring during and after project implementation would occur to document site protection and condition (HR/TR-5).
Kuwanwisiwma, Leigh	We have also consulted on this proposal at our regular administrative meetings and have stated we looked forward to continuing consultations with the four Forests on the development and implementation of the cultural resources survey plans, and Traditional Cultural Properties and ethnographic studies.	(12-5) We look forward to the continued discussion.

Kuwanwisiwma, Leigh	We have now reviewed the Draft Environmental Impact Statement, and understand Alternative C the Preferred Alternative responds to the issues of conservation of large trees and increased restoration and research. Our March 21, 2011 letter is not cited on page 35, Tribal Consultation. We also understand that in addition to Appendix J, a heritage strategy, initial Section 106 report, and tribal relations analysis have been developed for the project, and that effects on cultural resources from the action alternatives are not considered to be adverse. However, regardless of whether additional high impact or intense mechanical treatments occur under the preferred alternative, we look forward to continuing consultation on this project including the review of cultural resources survey reports, mitigation of adverse effects, identification and protection of Traditional Cultural Properties, and in the event of any inadvertent discoveries.	(12-6) Thank you for your comment. Your March 21, 2011 letter will be included in the FEIS and consultation will continue into project implementation. Several design features in the web version of the DEIS (pp. 571-572) and FEIS commit to continuing consultation throughout the implementation stage. This includes consulting with federally recognized tribes prior to initiating project-specific task orders to identify traditional use areas (HR/TR-7), providing detailed treatment area maps to determine if other sensitive areas of tribal importance could be potentially impacted (HR/R-8), and, adjusting treatment timing as possible to avoid seasonal plant gathering and ceremonial use (HR/TR-9).
Kuwanwisiwma, Leigh	Regarding Forest Plan Amendment 3: Effect Determination for Cultural Resources, we understand this is a specific, one-time variance for the Coconino National Forest deletes the standard that addresses achieving a "no effect" determination and adds the words "or no adverse effect" to the remaining standard. More importantly than "no effect" or "no adverse effect" determinations, as demonstrated by both current and potential litigation in the Southwest and across the Country, the Forest Service has yet to integrate its Native American Sacred Sites and Traditional Cultural Properties consultations into its management decisions.	(12-7) Thank you for your comment. The forest plan revision process will address your concern of integrating Sacred Sites and Traditional Cultural Properties consultation into management decisions.
Kuwanwisiwma, Leigh	Nevertheless, we also look forward to continuing consultation with the Forest Service in the hope that in the future, these consultations will lead to the integration of the content of tribal consultations into the Forest Service's management decisions. If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmonzart@hopi.nsn.us. Thank you for your consideration.	(12-8) We look forward to the continued discussion.
Laieski, Caleb	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations	Thank you for your comment. Please see our response to Letter #19.

of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Lamb, I have enjoyed my visits to Arizona, especially the Coconino/Flagstaff (146-1) Thank you for your comment. Please see our response to

Antonia	area. I have read your plan to burn millions of acres of forest in the name of ecological restoration and it appalls me. I am profoundly opposed to your idea of selling precious forest acreage and then burning the rest over a broad area and a longterm time span. Have you looked at the impacts of climate change lately? We must support and preserve and heal the forests that remain on our planet and in our beloved country. Your plan is an affront to the American way of life and to life, period. Please reconsider.	comment 145.
Larsen, Areil	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected,	Thank you for your comment. Please see our response to Letter #19.

Lehan, Diana	with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the	(69-1) Thank you for your comments. Please see the response to letter #19.

	landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.
Lenz, Debby	How is it possible to "serve" the forest, stands of old trees, by burning them to the ground?? It appears as you all, are more in service to the logging industry than protecting the trees. The habitat that will be lost to not only the protected spotted owl, but also to 1000s of other established living beings of the forest will accelerate the decline of those species on "our" planet. I say this because out of your ignorance you all fail to see the interconnectedness of us all..this leads to false ideas about insisting on a "mix" of forest that represents your ideas, but not the reality that everything changes..the Redwoods of California originated in China..should they all be burnt to the ground because they are not the original species??? Most would answer "NO" out of instinct, that we need all the trees we can find to be preserved… the rapid burning of the rain forest has led to an acceleration of Global Warming and the unpredictable strange weather patterns and increase in the intensity of storms..(Tornados in Oklahoma) Is that what you want for your friends and family?? all for the sake of a quick $ from the logging companies?? What is wrong with you people, your Job is to represent the people, and their forests, not engage in profiteering..soon there will be no forest left, temperatures will increase to a point where they are unbearable for human life, then there will be no people left, but the planet will continue, it just will no longer be inhabitable by life..look at Mars?? Once there was water…is that the future of the Planet Earth..?? We only need a Forest Service interested in protecting the trees and keeping a forest intact, not one interested in logging for profits, and protecting the houses and settlements..Fires are natural occurrences, allow them to be natural..is this all because of the Nuclear Facility?? that should also be closed down, we need to take a look at our priorities in this country, and quick living only for instant gain, electricity, more gas and oil….long term health and well being for the entire ecosystem would be a much wiser priority… Unfortunately Government has become oil and gas/ electricity profiteering, where reason no longer resides, soon there will be no more uncontaminated waters as a result of all the fracking…what is going in on these "representatives" minds, we can live without oil, and electricity, but not without clean water.
Lenz, Debby	How is it possible to "serve" the forest, stands of old trees, by burning them to the ground?? It appears as you all, are more in service to the logging industry than protecting the trees. The habitat that will be lost to not only the protected spotted owl, but also to 1000s of other established living beings of the forest will accelerate the decline of those species on "our" planet. I say this because out of your ignorance you all fail to see the interconnectedness of us all..this leads to false ideas about insisting on a "mix" of forest that represents your ideas, but not the reality that everything changes..the Redwoods of California originated in China..should they all be burnt to the ground because they are not the

	original species??? Most would answer "NO" out of instinct, that we need all the trees we can find to be preserved… the rapid burning of the rain forest has led to an acceleration of Global Warming and the unpredictable strange weather patterns and increase in the intensity of storms..(Tornados in Oklahoma) Is that what you want for your friends and family?? all for the sake of a quick $ from the logging companies?? What is wrong with you people, your Job is to represent the people, and their forests, not engage in profiteering..soon there will be no forest left, temperatures will increase to a point where they are unbearable for human life, then there will be no people left, but the planet will continue, it just will no longer be inhabitable by life..look at Mars?? Once there was water…is that the future of the Planet Earth..?? We only need a Forest Service interested in protecting the trees and keeping a forest intact, not one interested in logging for profits, and protecting the houses and settlements..Fires are natural occurrences, allow them to be natural..is this all because of the Nuclear Facility?? that should also be closed down, we need to take a look at our priorities in this country, and quick living only for instant gain, electricity, more gas and oil….long term health and well being for the entire ecosystem would be a much wiser priority… Unfortunately Government has become oil and gas/ electricity profiteering, where reason no longer resides, soon there will be no more uncontaminated waters as a result of all the fracking…what is going in on these "representatives" minds, we can live without oil, and electricity, but not without clean water.	
Lenz, Debby	How is it possible to "serve" the forest, stands of old trees, by burning them to the ground?? It appears as you all, are more in service to the logging industry than protecting the trees.	(125-4) Thank you for your comment/opinion.
Lenz, Debby	The habitat that will be lost to not only the protected spotted owl, but also to 1000s of other established living beings of the forest will accelerate the decline of those species on "our" planet. I say this because out of your ignorance you all fail to see the interconnectedness of us all..this leads to false ideas about insisting on a "mix" of forest that represents your ideas, but not the reality that everything changes..the Redwoods of California originated in China..should they all be burnt to the ground because they are not the original species??? Most would answer "NO" out of instinct, that we need all the trees we can find to be preserved…	(125-4) Thank you for your comment. Please see page 8 of the DEIS for the purpose and need for this restoration project. Please see the wildlife secton in chapter 3 for the environmental consequences associated with threatened and endangered species.
Lenz, Debby	the rapid burning of the rain forest has led to an acceleration of Global Warming and the unpredictable strange weather patterns and increase in the intensity of storms..(Tornados in Oklahoma) Is that what you want for your friends and family?? all for the sake of a quick $ from the logging companies?? What is wrong with you people, your Job is to represent the people, and their forests, not engage in profiteering..soon there will be no forest left, temperatures will increase to a point where they are unbearable for human life, then there will be no people left, but the planet will continue, it just will no longer be inhabitable by life..look at Mars?? Once there was water…is that the future of the Planet Earth..??	
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Lenz, Debby	the rapid burning of the rain forest has led to an acceleration of Global Warming and the unpredictable strange weather patterns and increase in the intensity of storms..(Tornados in Oklahoma) Is that what you want for your friends and family?? all for the sake of a quick $ from the logging companies?? What is wrong with you people, your Job is to represent the people, and their forests, not engage in profiteering..soon there will be no forest left, temperatures will increase to a point where they are unbearable for human life, then there will be no people left, but the planet will continue, it just will no longer be inhabitable by life..look at Mars?? Once there was water…is that the future of the Planet Earth..	
Lenz, Debby	Unfortunately Government has become oil and gas/ electricity profiteering, where reason no longer resides, soon there will be no more uncontaminated waters as a result of all the fracking…what is going in on these "representatives" minds, we can live without oil, and electricity, but not without clean water.	(125-10) Thank you for your comment.
Lenz, Debby	the rapid burning of the rain forest has led to an acceleration of Global Warming and the unpredictable strange weather patterns and increase in the intensity of storms..(Tornados in Oklahoma) Is that what you want for your friends and family?? all for the sake of a quick $ from the logging companies?? What is wrong with you people, your Job is to represent the people, and their forests, not engage in profiteering..soon there will be no forest left, temperatures will increase to a point where they are unbearable for human life, then there will be no people left, but the planet will continue, it just will no longer be inhabitable by life..look at Mars?? Once there was water…is that the future of the Planet Earth..??	
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LeStarge,	The following comment is submitted on behalf of Linda Taunt,	(16-1) Thank you for your interest and assistance in designing the

Wendy	Deputy Division Director of the Water Quality Division, Arizona Department of Environmental Quality (ADEQ): We received the notice for the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative for the Coconino and Kaibab National Forests for restoration actions across the forests over a period of 10 years. After reviewing the Draft Environmental Impact Statement, ADEQ has no comments related to water quality that were not already addressed. Thank you for the opportunity to participate in the review process.	project.
Libbey, Rich	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document	(62-1) Thank you for your comments. Please see our response to letter #19.

	that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. Sincerely, Mr. Rich Libbey 18603 Hale Lake Dir. Grand Rapids, MN 55744-4526 (218) 326-1874	
Lininger, Jay	Please find attached to this message and pasted below a letter from five conservation organizations commenting on the Draft Environmental Impact Statement for activities connected to the Four Forest Restoration Initiative in the Coconino and Kaibab National Forests. All attachments described in the comment letter are embedded in the PDF document.	(196-1) Thank you providing comments.
Lininger, Jay	This letter provides comment from the Center for Biological Diversity, Grand Canyon Wildlands Council, Great Old Broads for Wilderness, the Sierra Club, and the White Mountain Conservation League regarding the Draft Environmental Impact Statement ("DEIS) on activities connected to the Four Forest Restoration Initiative ("4FRI" or "project") in the Coconino and Kaibab National Forests. This comment is timely because the notice of availability published in the Federal Register states that the Extension]comment period[auto-markup end] shall end on May 29, 2013. See 78 Fed. Reg. 19261 (Mar. 29, 2013). The Center for Biological Diversity ("Center") is a non-profit public interest organization with offices nationwide, including Flagstaff and Tucson, Arizona, representing more than 500,000 members and supporters dedicated to the conservation and recovery of fauna and flora at-risk of extinction. The Center is a founding stakeholder in the 4FRI and offered scoping comments on the project in letters dated March 14, 2011, and September 2, 2011, respectively, each of which responded to different versions of the	(196-2) Thank you for your reviewing the DEIS.

Lininger, Jay	proposed action. Grand Canyon Wildlands Council is a regional conservation organization dedicated to protecting and restoring Wild Nature in the Grand Canyon Ecoregion, including the Little Colorado River watershed. Great Old Broads for Wilderness ("Broads") is a national organization that uses the voices and activism of elders to preserve and protect wilderness and wild lands. Conceived by older women who love wilderness, Broads gives voice to the millions of older (and not so able) Americans who want to protect their public lands as Wilderness for this and future generations. We bring voice, knowledge, commitment, and humor to the movement to protect our last wild places on earth. The Sierra Club is one of America's oldest, largest and most influential grassroots environmental organizations. The Sierra Club has more than 1.3 members and supporters nationally, including more than 12,000 members of the Grand Canyon Chapter. Inspired by nature, we work together to fulfill the Sierra Club mission "…to explore, enjoy and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environments." Our members have a significant interest in the 4FRI, as we have long been involved in advocating for protection of these forests and we use these areas for hiking, camping, backpacking, bird watching, wildlife viewing, astronomy, photography, and more. We have been involved in the planning process for the 4FRI, as well. The White Mountain Conservation League ("WMCL") embraces and encourages stewardship of all components of the region's diverse ecosystems and recognizes their value to our regional economic vitality and quality of life. The WMCL encourages citizens to actively engage in all levels of decision making on land and wildlife management to ensure the wonders of the White Mountains is a reality for us and future generations. Purpose and need Collectively, we support the Forest Service's stated goal of ecological restoration of Mogollon Plateau ponderosa pine forests. European settlement and management of the region since the mid-1800s precipitated significant changes that have made forests less resilient to natural disturbances including wildland fire and insect outbreaks. Historic logging severely depleted the number	(196-3) Thank you for supporting the purpose and need.

and distribution of old and large trees. Livestock grazing and fire suppression continue to encourage unnaturally dense stands of small trees, resulting in elevated competition for available sunlight, water and soil nutrients, decreased abundance and diversity of understory grasses and forbs, and increased density of hazardous fuels. These changes promote stand-replacing crown fires of increasing extent that compound ecological change to the detriment of human communities and native species populations. If the current trajectory of anthropogenic change to the landscape continues, ecological damage will accumulate and, with global climate change, likely accelerate. Therefore, the undersigned are parties to a broad scientific, social and political consensus that restoration of ponderosa pine forests is necessary and urgent to conserve the ecological systems upon which human society and biological diversity commonly depend.

In our view, the 4FRI must strategically integrate community protection, ecological restoration, fire management and biodiversity protection in a landscape context. A centrally important desired outcome of these efforts is to facilitate the safe re-establishment and longterm management of ecologically beneficial fire regimes. Because fire regimes naturally track variability in climate, and because fire plays a keystone ecological role shaping forest structure and composition, ecological restoration that leads to the re-establishment of natural fire regimes at landscape scales will allow forest changes to track climate change over time and promote forest resilience. Coupled with other restorative management, strategic reduction of small tree density and planned burning will reduce the potential for rapid, widespread forest dieback amid foreseeable climate change and large-scale fires. The release of heavily managed forests into a self-regulating, disturbance-maintained condition is fundamentally different than the industrial “sustained yield” forestry model that caused the existing degraded condition of ponderosa pine forests. It will yield ecological benefits including heterogeneity, adaptation, carbon sequestration and conservation of native biological diversity in the coming century.

Lininger, Jay

It is also necessary to inform restoration treatments with spatially explicit landscapescale assessment of where unplanned fires can be

Lininger, Jay

(196-4) While we generally agree with your statements, this project will not result in a landscape that is regulated solely by natural disturbances. Treatments in grasslands followed by prescribed fire come closest to being self-regulated. Also see our responses to strategic placement of treatments.

(196-5) Planning treatments to address future unplanned ignitions are out of the scope of this analysis. The FEIS does not include an

	actively managed for resource benefits in order to ensure that treatments are efficiently prioritized to accomplish multiple objectives— including community protection, wildlife habitat protection and restoration of ecological processes. The project should integrate community protection with ecological restoration and combine fire management objectives with vegetation treatments at localized scales. Linking project-scale treatments with fire management at a landscape scale will increase the probability that management will successfully establish functional fire regimes at minimum cost while providing for public safety.	alternative that address the management of unplanned ignitions. The fire ecology effects in the DEIS state, “As thinning and first entry burns were completed, burn windows would expand for larger areas so more burning could occur when ventilation was good. The ability to manage unplanned ignitions would expand as 4FRI (and other projects) is implemented” (DEIS, page 158). The Fire Ecology and Air Quality Report states on page 128, “Decision space for managing unplanned ignitions would expand as 4FRI (and other projects) are implemented.” Regarding integration of vegetation treatments at localized scales, the DEIS displays that alternatives B-C best accomplish that objective.
Lininger, Jay	This letter provides comment from the Center for Biological Diversity (“Center”) on the Draft Environmental Impact Statement (“DEIS) for the Four Forest Restoration Initiative (“4FRI” or “project”) on the Coconino and Kaibab National Forests. The Center is a nonprofit public interest organization with offices nationwide, including in Flagstaff and Tucson, Arizona, representing more than 500,000 members and supporters dedicated to the conservation and recovery of fauna and flora at-risk of extinction. The Center is a founding stakeholder in the 4FRI and it previously supplied the Forest Service with detailed scoping comment letters dated March 14, 2011, and September 2, 2011, respectively, each of which responded to different versions of a proposed action for this project.[1][1] This comment is timely because the notice of availability published in the Federal Register states that the Extension]comment period[auto-markup end] shall end on May 29, 2013. See 78 Fed. Reg. 19261 (Mar. 29, 2013).	(180-1) Thank you for your comments.
Lininger, Jay	The Center strongly supports the Forest Service's stated goal of ecological restoration of Mogollon Plateau ponderosa pine forests. European settlement and management of the region since the mid-1800s precipitated significant changes that have made forests less resilient to natural disturbances including wildland fire and insect outbreaks. Historic logging severely depleted the number and distribution of old and large trees. Livestock grazing and fire suppression continue to encourage unnaturally dense stands of small trees, resulting in elevated competition for available sunlight, water and soil nutrients, decreased abundance and diversity of understory grasses and forbs, and increased density of hazardous fuels. These	(180-2) Thank you for supporting restoration objectives.

	changes promote stand-replacing crown fires of increasing extent that compound ecological change to the detriment of human communities and native species populations. If the current trajectory of anthropogenic change to the landscape continues, ecological damage will accumulate and, with global climate change, likely accelerate. Therefore, the Center is part of a broad scientific, social and political consensus that restoration of ponderosa pine forests is necessary and urgent to conserve the ecological systems upon which human society and biological diversity commonly depend. In our view, the 4FRI must strategically integrate community protection, ecological restoration, fire management and biodiversity protection in a landscape context. A centrally important desired outcome of these efforts is to facilitate the safe re establishment and longterm management of ecologically beneficial fire regimes. Because fire regimes naturally track variability in climate, and because fire plays a keystone ecological role shaping forest structure and composition, ecological restoration that leads to the re-establishment of natural fire regimes at landscape scales will allow forest changes to track climate change over time and promote forest resilience. Coupled with other restorative management, strategic reduction of small tree density and planned burning will reduce the potential for rapid, widespread forest dieback amid foreseeable climate change and large-scale fires. The release of heavily managed forests into a self-regulating, disturbance-maintained condition is fundamentally different than the industrial "sustained yield" forestry model that caused the existing degraded condition of ponderosa pine forests. It will yield ecological benefits including heterogeneity,	
Lininger, Jay	adaptation, carbon sequestration and conservation of native biological diversity in the coming century. It is also necessary to inform restoration treatments with spatially explicit landscapescale assessment of where unplanned fires can be actively managed for resource benefits in order to ensure that treatments are efficiently prioritized to accomplish multiple objectives— including community protection, wildlife habitat protection and restoration of ecological processes. The project	(180-3) While we generally agree with your statements, this project will not result in a landscape that is regulated solely by natural disturbances. Treatments in grasslands followed by prescribed fire come closest to being self-regulated. Also see our responses to strategic placement of treatments.
Lininger, Jay	should integrate community protection with ecological restoration and combine fire management objectives with vegetation treatments	(180-4) Planning treatments to address future unplanned ignitions are out of the scope of this analysis. The FEIS does not include an alternative that address the management of unplanned ignitions. The fire ecology effects in the DEIS state, "As thinning and first entry burns were completed, burn windows would expand for larger areas so more burning could occur when ventilation was good. The ability to manage unplanned ignitions would expand as 4FRI (and other projects) is implemented" (DEIS, page 158). The Fire Ecology and Air Quality Report

	at localized scales. Linking project-scale treatments with fire management at a landscape scale will increase the probability that management will successfully establish functional fire regimes at minimum cost while providing for public safety. Given the above, the Center regards the 4FRI project as a potentially beneficial activity insofar as vegetation treatments at strategic locations can facilitate landscape-scale restoration of fire-adapted ecosystems. Fire use is essential to forest restoration and a key ingredient of the purpose and need (Allen et al. 2002, Falk et al. 2006). Foreseeable climate change and chronic drought are likely to influence wildland fires to become larger and more frequent at a landscape scale (Running 2006, Seager and Vecchi 2010, Westerling et al. 2006). In the absence of active fuel management and fire use for resource benefits on short rotations compared to the era of total fire suppression, the Forest Service manages landscapes for large-scale, high-intensity fires that outrun suppression resources in extreme weather and create unnecessary management expense and unacceptable risks to human life and resource values. We encourage the Forest Service to design the project to promote fire use for resource benefits while providing for public safety. Adverse effects of fire control practices to the environment are well documented (Backer et al. 2004) and should be analyzed and disclosed where	states on page 128, "Decision space for managing unplanned ignitions would expand as 4FRI (and other projects) are implemented." Regarding integration of vegetation treatments at localized scales, the DEIS displays that alternatives B-C best accomplish that objective.
Lininger, Jay	proposed treatments are designed to increase the effectiveness of fire suppression. A proactive landscape-scale restoration approach must deal with fundamental ecological problems by addressing their root causes. Ultimately, forest structure and fire regime must be restored in an integrated way (DellaSala et al. 2004). In ponderosa pine forest, this means emphasizing landscape-scale use of fire as the primary self-sustaining regulatory process that will naturally promote ecosystem adaptation and resilience to inevitable disturbances and effects of climate change—and then scaling down to coordinated project-level actions including fuel treatments that accomplish landscape-level objectives (Peterson and Johnson 2007). The environmental analysis should demonstrate that the project fits into a coordinated	(180-5) Prescribed fire treatments are an integral part of the overall vegetation management design. The project is designed to establish forest structure, composition and pattern so that fire can be safely re-introduced at the landscape scale (DEIS, page 9). The concept of treating only strategic locations was determined to be outside the scope of this project because it would not result in landscape scale restoration; it would be a fuels treatment. Vegetation treatments include both mechanical and fire treatments, and both are proposed for use at a landscape scale. We agree that fire is an essential component of forest restoration but treatments are based primarily on ecological inputs, not just changing fire behavior. The fire ecology effects in the DEIS state, "As thinning and first entry burns were completed, burn windows would expand for larger areas so more burning could occur when ventilation was good. The ability to manage unplanned ignitions would expand as 4FRI (and other projects) is implemented" (DEIS, page 158). The Fire Ecology and Air Quality Report states on page 128, "Decision space for managing unplanned ignitions would expand as 4FRI (and other projects) are implemented."
Lininger, Jay	management strategy. This is best accomplished through spatial modeling of potential fire behavior and treatment effects under	(180-6) The proposed treatments displayed in the DEIS go beyond hazardous fuels mitigation. The treatments are designed to accomplish landscape level restoration objectives. One of the outcomes of a restored landscape is the re-establishment of the historic fire regime (high frequency, low severity). We agree that forest structure and fire regime go hand in hand and that restoration treatments should address both. The process used for this analysis has used is very similar to that outlined by Peterson and Johnson (2007) which was cited in your comment. There is no literature cited to support the statement that proposes to include both the 97th and 85th percentile. When weather percentiles are modeled, it is less representative of real fire behavior than modeling the conditions under which a large fire has actually occurred. Additionally, when modeling percentile, there is no way to

conditions that include both severe and moderate (e.g., 97th and 85th percentile) fire weather, as well as different configurations of potential treatments (see “fuel treatments” below). Such analysis will provide ample basis for study and development of action alternatives that consider variable fuel treatment intensities and orientations to give the decision-maker and the public a meaningful basis for comparison of environmental impacts that may result.

check to be sure the modeled behavior is likely to reasonably represent potential fire behavior. When modeling a fire that has actually occurred, it is possible to calibrate the model so there is more assurance that modeled behavior has some relation to expected behavior under conditions that have produced a large, high severity fire. Appendix D in the Fire Ecology report states, “Generally, modeling percentiles of fire weather and fuel characteristics is used to model various fire indices, such as Energy Release Component, Burning Index, or Spread Component (as opposed to modeling fire behavior at the X%ile of temperature, humidity, or some other individual factor). Sometimes fire behavior is modeled, but it is more useful for instances that do not involve implementing site-specific management. Percentile weather and fuel conditions are the conditions for which a specific number of days per year are above or below a given percentile. For example, if one were to model the 97th percentile for a given area, the relative humidity (rh) and fuel moistures use represent levels for which on 97% of days per year it is higher. So, if the 97th percentile rh is 10%, it means that for 97% of the days per year, minimum humidity is at or greater than 10%. If the 97th percentile temperature is 80°F, it means that, for 97% of days per year, the temperature is at or lower than 80°F, and so on. The chances of the 97th percentile relative humidity; temperature; wind speed;1, 10, 100, 1000 hr, foliar, woody, and herbaceous fuel moistures, and wind direction all occurring on the same day are slim. Therefore, results of such modeling usually over-predict fire behavior. Even for extreme fire behavior, such as occurred in the Wallow, Schultz, and Rodeo/Chediski fires, the percentiles for weather and fuel parameters were not the same on any given day. Therefore, for this EIS, fire behavior was characterized based on the conditions under which the Schultz Fire burned on June 20th, 2010. McHugh (2006) states the process of modeling includes the following: Define the modeling objective or question, Model selection based on modeling objective or question, Spatial and temporal data development required by selected model, Gather supporting spatial and temporal data, Data critique and analysis of developed data, Calibration of the model to a past event(s), Simulations, evaluation and critique of results, and documentation, Gaming-out, and what-if scenarios of fuel treatment location and prescription, Evaluation, write-ups, and presentation of results

Lininger, Jay

The DEIS is expected to be the only analysis of significant environmental impacts that may result from proposed forest treatments on 587,923 acres over a 10-to-20 year period on two national forests. However, it is so broad in scope that it cannot provide information necessary for the public to understand even basic facts about how treatments will affect forest structure (e.g., tree densities, size class distributions, regeneration openings, interspaces, canopy cover). The lack of site-specific analysis in the DEIS limits the public's ability to raise issues about environmental impacts and precludes those issues from being addressed through meaningful comparison of action alternatives by the decision-maker. The alternatives differ only by the acreage to be affected by a similar menu of treatments, and they contain identical forest plan amendments, which precludes comparison of effects to threatened and sensitive species. See DEIS at 62 (alternatives summary). For example, in scoping comments, the Center specifically asked the Forest Service to "develop a proposed action that is sufficiently specific to facilitate meaningful Extension]public comment[auto-markup end], issue identification and alternative development." As shown below, the DEIS does not provide the requested level of

…Calibration of modeling scenarios to past events is critical. Calibration provides a mechanism for testing interactions of the data and model, allows one to evaluate model and data performance in predicting or matching to past documented fire events, provides insight into the respective fire models and how the interactions of data and user-defined model settings can affect modeled outputs. Additionally, and most importantly, it provides a means to evaluate the relevancy and accuracy of the data and instill confidence in future modeling projections." When modeling percentiles, there is no reference for evaluating when the outputs are accurate. The FEIS will not include a 97th percentile model. Regarding the suggestion that configurations of different 'fuel' treatments be considered – that would be appropriate if this was a fuels reduction project. Since 4FRI is a restoration project, treatments were determined based on site potential, habitat, and other restoration objectives, not specifically to change fire behavior. Decreased fire behavior is one of the results of restoration in the project area (DEIS, page 157 to 160).

(180-7) The DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For

specificity, and it fails to meet requirements of the National Environmental Policy Act ("NEPA").

transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601).The site-specificity of the analysis was tested by the 4FRI stakeholder group on May 12, 2013. In response to comments on the DEIS, the stakeholders wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site

Lininger, Jay	The Forest Service intends the 4FRI to cover 2.4-million acres on four national forests. Given its enormous and unprecedented scale, the 4FRI should be analyzed in a programmatic environmental impact statement with a decision to be followed by tiered, site-specific analysis of planned treatments at smaller scales. The 4FRI is a comprehensive management proposal warranting analysis in a programmatic EIS, after which site-specific environmental impacts of implementation plans should be studied and disclosed in tiered analysis following NEPA procedures. The U.S. Supreme Court stated the principle that if a government agency has not made a certain proposal, citizens cannot force the agency to combine several truly separate projects into a single environmental impact statement; but the reverse of this principle is that when an agency has made a comprehensive proposal, it has no choice but to evaluate the entire proposal in an EIS. See Kleppe v. Sierra Club, 427 U.S. 390, 409 (1976).	specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue" (4FRI Stakeholder, 2013 Cara Letter 155). Most examples of using site-specific data to inform the environmental consequences in the DEIS can be found in the each resource report in the methodology sections. Examples in the DEIS include fire which discloses fire behavior at specific locations of concern, at the subunits, the restoration unit, landscape scales and specific locations (such as Pulliam Airport, Kachina Village, Perkins Telescope, etc. (DEIS, p. 150). How individual MSO PAC treatments were identified for treatment in appendix B pp. 443-444 of the DEIS. (180-3) The recommendation to complete a programmatic EIS is outside the scope of this analysis. Our response to this contention has not changed since we responded to comments received to the January 2011 (initial) draft proposed action. Although the objective for 4FRI is to complete landscape restoration across four forests, this is not equivalent to having a connected action. As of November 2014, there is no analysis underway in this EIS that renders decisions that would be needed by the next analysis in order to move forward. It is unknown whether there may be one analysis or several. Even addressing the next analysis (analyses?) in terms of cumulative effects remains too speculative as there are no reasonably foreseeable (quantifiable) proposed activities that can be evaluated in terms of overlap in time and space to the Coconino NF and Kaibab NF analysis. Decisions such as the location of the next analysis or analyses (including analysis boundaries) and the existing and desired conditions for that landscape have not been determined. Please provide specific examples of where Coconino NF and Kaibab NF proposals, currently under analysis, will: (i) automatically trigger other actions which may require environmental impact statement, (ii) cannot or will not proceed unless other actions

have been taken previously or simultaneously, or (iii) they are interdependent parts of a larger action and depend on the larger action for its justification (40 CFR § 1508.25(a) (1) (i)-(iii)). If the goal is truly to affect landscape restoration as quickly as practicable, we do not understand how taking 1 to 2 years (or more) to conduct a programmatic EIS that would then require numerous, multiple analyses moves towards this objective. The issue of moving forward with a programmatic EIS versus as project specific EIS was discussed with the Council of Environmental Quality as early as 2009 when the landscape restoration proposal was being prepared as a CFLR proposal. Stakeholder representatives were on the conference call. The notes from this call are available or can be found in the project record. This EIS is specific to the portions of the Coconino and Kaibab National Forests boundaries within the project boundaries, and as such, are analyzed based on the respective Forest Plan guidance.

Lininger, Jay	We are concerned that the scale of this DEIS precludes the Forest Service from meeting NEPA requirements without a commitment to subsequent site-specific NEPA analyses that are tiered to the programmatic EIS. See Salmon River Concerned Citizens v. Robertson, 32 F.3d 1346 (9th Cir. 1994) (court upheld EIS because the government made clear it would prepare site-specific assessments "tiered" to the programmatic analysis); Marble Mountain Audubon Soc. v. Rice, 914 F.2d 179, 182 (9th Cir. 1990) (site-specific impacts must be addressed in individual NEPA documents tiered to broader planning documents if the latter do not address such impacts); Neighbors of Cuddy Mountain v. U.S. Forest Serv., 137 F.3d 1372, 1380 (9th Cir. 1998) ("Nor is it appropriate to defer consideration of cumulative impacts to a future date"); Nat'l Parks Conservation Assoc. v. Babbitt, 241 F.3d 722 (9th Cir. 2001) (requiring disclosure of environmental impacts in NEPA analysis "before a decision that may have a significant adverse impact on the environment is made"); also see 40 C.F.R. 1500.1(b), 1502.5, 1506.1. To comply with NEPA, the Forest Service should have prepared one comprehensive EIS for the entire 4FRI program (rather than segmenting its analysis into component parts) to be followed later by site-specific NEPA analyses.	(180-9) Please see our previous response.
Lininger,	Moreover, the Forest Service was required to prepare the	(180-10) The Phase 1 4FRI Stewardship contract is not a NEPA decision

Jay	comprehensive EIS for the 4FRI program before awarding the "Phase 1" contract to Pioneer Forest Products. See 40 C.F.R. § 1500.1(b) ("NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken"); 1501.2 ("Agencies shall integrate the NEPA process with other planning at the earliest possible time"); 1502.2(g) ("Environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made"); 1502.5 (the EIS "shall be prepared early enough so that it can serve practically as an important contribution to the decision-making process and will not be used to rationalize or justify decisions already made"). No prior NEPA analysis or decision for the component 4FRI projects named in the Pioneer contract states their connection to, similarity with, or cumulative effects of the overall 4FRI program. As a result, significant cumulative effects to the environment remain undisclosed.	and will utilize existing signed NEPA decisions to implement the contract. Each of the NEPA decision is designed to meet the intent of their respective Forest Plans, not a comprehensive restoration strategy. The phase 1 4FRI contract is a mechanism to implement individual NEPA decisions that in turn, implement the respective Forest Plan. The cumulative effects of implementing signed NEPA decisions are disclosed in each respective NEPA document and are tied to future foreseeable actions that are outlined in the Schedule of Proposed actions at the time of the analysis. Future foreseeable actions are NEPA actions described in each respective Forests Schedule of Proposed Actions. Each discipline within the 4FRI EIS has displayed the time and place context for their cumulative effects. The following lists the cumulative effects boundary and timeframes by resource with the DEIS soil and water, the area and time are defined on p120 of the DEIS; vegetation the area and time are defined on p 145 of the DEIS; fire ecology the area and time are defined in the DEIS on page 164; air quality: the area and time are defined in the DEIS on page 172;For wildlife, the cumulative effects area and time are disclosed in the DEIS on page 187 for MSO, page 192 for the black-footed ferret, in Table 71 (DEIS p 201-216) for sensitive species, Table 75 for management indicator species (p 237), on page 241 for migratory birds and table 78 for aquatic species (215-255) as well as in the text on page 256 for aquatic species. The DEIS also references more details for cumulative effects analysis for all species in Appendix 12 of the wildlife specialist report, which is included by reference in the DEIS on page 174. In the FEIS, the wildlife section of the cumulative effect analysis for all species was updated due to response to comments. In response to comments on the level of detail of the analysis Mexican spotted owl and goshawk, additional information and specificity was added to the cumulative effects analysis. For Recreation the area and time are defined on page 286, page 290 and page 296 of the DEIS. For Lands and Minerals the area and time are defined on page 300 of the DEIS. For Scenery the area and time are defined on page 305 of the DEIS. For range, the area and time are defined on pages 37-38 of the Range Specialist Report that is included by reference in the DEIS (page 311). For Transportation the area and time are defined on page 321 of the DEIS. Appendix F in the DEIS (pages 679-697) list all of the cumulative effects projects

considered for most resources. Soil, water and aquatics have a larger cumulative effects boundary based on 6th code watersheds. The data for the cumulative effects projects for these resources are located in the Soil Specialist Report that is included by reference to the DEIS (page 105), Appendix C pages 410-425. As such, the time and extent of the projects considered for cumulative effects are only those within the extents defined by each respective resource. From the 4FRI contract expected task order table page 79 CBD attachment, this excludes the East Clear Creek, Upper Beaver Creek (Appendix F on page 692, but notes that 90% of the area is outside the project area---the task order within the contract is outside the project area), Christopher, Myrtle, Timber Mesa and Rim Lakes projects because they are outside the extent of defined cumulative effects boundary for each resource within the DEIS. The cumulative effects for those projects are disclosed within their individual planning documents are specific to the time and space as defined in each individual analysis. As for the need to do a comprehensive planning document and the subsequent cumulative effects thereof, our response to this contention has not changed since we responded to comments received to the January 2011 (initial) draft proposed action. Although the objective for 4FRI is to complete landscape restoration across four forests, this is not equivalent to having a connected action. There is no analysis underway in this EIS that renders decisions that would be needed by the next analysis in order to move forward. It is unknown whether there may be one analysis or several. Even addressing the next analysis (analyses?) in terms of cumulative effects was too speculative as there are no reasonably foreseeable (quantifiable) proposed activities that can be evaluated in terms of overlap in time and space to the Coconino NF and Kaibab NF analysis. Decisions such as the location of the next analysis or analyses (including analysis boundaries) and the existing and desired conditions for that landscape have not been determined. Please provide specific examples of where Coconino NF and Kaibab NF proposals, currently under analysis, will: (i) automatically trigger other actions which may require environmental impact statement, (ii) cannot or will not proceed unless other actions have been taken previously or simultaneously, or (iii) they are interdependent parts of a larger action and depend on the larger action for its justification (40 CFR § 1508.25(a) (1) (i)-(iii)). If the

goal is truly to affect landscape restoration as quickly as practicable, we do not understand how taking 1 to 2 years (or more) to conduct a programmatic EIS that would then require numerous, multiple analyses moves towards this objective. The issue of moving forward with a programmatic EIS versus as project specific EIS was discussed with CEQ as early as 2009 when the landscape restoration proposal was being prepared as a CFLR proposal. Stakeholder representatives were on the conference call. The notes from this call are available or can be found in the project record. This EIS is specific to the Kaibab and Coconino National Forests, and as such are implementing the guidance associated with these respective Forest Plans.

	"A programmatic [EIS] is a broad-based, long range plan that discusses the overall environmental impacts of a proposed action." City of Tenakee Springs v. Block, 778 F. 2d 1402, 1403 n.1 (9th Cir. 1985) (citing Nat'l Wildlife Fed. v. U.S. Forest Serv., 592 F. Supp. 931, 940 n. 17 (D. Or. 1984)), amended on other grounds, Nat'l Wildlife Fed. v. U.S. Forest Serv., 643 F. Supp. 653 (D. Or. 1984), order vacated in part, appeal dismissed in part, Nat'l Wildlife Fed. v. U.S. Forest Serv., 801 F.2d 360 (9th Cir. 1986). Council on Environmental Quality ("CEQ") regulations implementing NEPA establish a process of "tiering," in which agencies prepare a broad impact statement and subsequently narrow the focus of NEPA analysis to account for site-specific impacts that may result from implementation of a programmatic management decision. See 40 C.F.R. §§ 1502.20, 1508.28. The first tier in NEPA analysis is the programmatic EIS, which "should focus on broad issues such as mode choice, general location and [] land use implications...," and reflect the "broad environmental consequences" of the choice to be made. Nat'l Wildlife Fed. v. Appalachian Regional Comm'n, 677 F.2d 883, 888 (D.C. Cir. 1981) (a programmatic EIS was not required for a large scale highway project where site-specific impact statements were being conducted). The second tier includes analysis that discloses site-specific environmental impacts. See 40 C.F.R. § 1508.28. In our view, this style of "tiered" NEPA analysis is ideally suited to the	
Lininger, Jay	hierarchical planning, implementation and monitoring needs of the 4FRI.	(180-11) Please see our previous responses.
Lininger,	Actions that are closely related, similar in timing or geography,	(180-12) This concern was addressed in response to comments received

Jay	and/or which may have cumulatively significant impacts to the environment must be analyzed together in a single EIS. The CEQ regulations "define the circumstances under which multiple related actions must be covered by a single EIS." Thomas v. Peterson, 753 F.2d 754, 758 (9th Cir. 1985). "Agencies shall use the criteria for scope (1508.25) to determine which proposal(s) shall be the subject of a particular statement. Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." 40 C.F.R. § 1502.4(a). The Ninth Circuit interprets this regulation to mean that, while agencies should be given "considerable discretion" in defining the scope of NEPA analysis, they are required to consider more than one action in a single EIS if they are part of a single proposal or are "connected actions," "cumulative actions," or "similar actions." Native Ecosystem Council v. Dombeck, 304 F.3d 886, 893-4 (9th Cir. 2002). The 4FRI meets the criteria for a single EIS.	on the January 2011 (initial) draft proposed action. Although the objective for 4FRI is to complete landscape restoration across four forests, this is not equivalent to having a connected action. There is no analysis underway in this EIS that renders decisions that would be needed by the next analysis in order to move forward. It is unknown whether there may be one analysis or several. Even addressing the next analysis (or analyses) in terms of cumulative effects was too speculative as there are no reasonably foreseeable (quantifiable) proposed activities that can be evaluated in terms of overlap in time and space to the Coconino NF and Kaibab NF analysis. Decisions such as the location of the next analysis or analyses (including analysis boundaries) and the existing and desired conditions for that landscape have not been determined. There is no evidence that the Coconino NF and Kaibab NF proposals as displayed in the DEIS and FEIS will: (i) automatically trigger other actions which may require environmental impact statement, (ii) cannot or will not proceed unless other actions have been taken previously or simultaneously, or (iii) they are interdependent parts of a larger action and depend on the larger action for its justification (40 CFR § 1508.25(a) (1) (i)-(iii)).
	CEQ regulations also prohibit agencies from breaking a project down into small component parts in an attempt to avoid disclosing significant environmental impacts. 40 C.F.R. § 1508.27(b)(7). "[T]here are situations in which an agency is required to consider several related actions in a single EIS. Not to require this would permit dividing a project into multiple 'actions,' each of which individually has an insignificant environmental impact, but which collectively have a substantial impact." Thomas v. Peterson, 753 F.2d at 758; also see West Chicago v. U.S. Nuclear Regulatory Comm'n, 701 F.2d 632, 650 (7th Cir. 1983) ("'[S]egmentation' allows an agency to avoid the NEPA requirement that an EIS be prepared for all major federal actions with significant environmental impacts by segmenting an	
Lininger, Jay	overall plan into smaller parts involving action with less significant environmental effects.").	(180-13) Please see our previous responses that addressed the programmatic EIS and connected action comments.
	Here, however, all of the proposed sales were reasonably foreseeable. They were developed as part of a comprehensive forest	
Lininger, Jay	recovery strategy. In fact, all five sales were disclosed by name to a coalition of logging companies, along with estimated sale quantities	(180-14) See our previous responses.

	and timelines even before the Big Tower EA was completed. At the very least, these sales raise substantial questions that they will result in significant environmental impacts. A single EIS, therefore, was required to address the cumulative effects of these proposed sales. The Forest Service was required to prepare one comprehensive EIS for entire 4FRI program before awarding the "Phase 1" contract to Pioneer Forest Products. See Metcalf v. Daley, 214 F.3d 1135 (9th Cir. 2000); 40 C.F.R. § 1500.1(b) ("NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken"); 1501.2 ("Agencies shall integrate the NEPA process with other planning at the earliest possible time"); 1502.2(g) ("Environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made"); 1502.5 (the EIS "shall be prepared early enough so that it can serve practically as an important contribution to the decision-making process and will not be used to rationalize or justify decisions already made"). None of the prior NEPA analysis or decision documents for contracted 4FRI projects on the Apache-Sitgreaves or Tonto national forests (i.e., Christopher, Myrtle, Timber	
Lininger, Jay	Basin and Rim Lakes) states their connection to, similarity with, or cumulative effects of the 4FRI program.	See response to comment 180-10.
Lininger, Jay	The DEIS identifies five "significant issues," each of which are suitable for comparison of action alternatives to inform the decision-maker and the public about the range of significant environmental impacts that may result from the project. However, it proposes three action alternatives that are virtually identical except for the acreage proposed to be affected by a common suite of treatments and forest plan amendments. For example, no alternative would implement the Coconino and Kaibab Forest Plans as they currently exist. This is a matter of concern to us because the plan amendments would jettison many standards and guidelines that are designed to ensure continued viability of threatened and sensitive species and old growth forests (USDA 1996). Lacking an action alternative that would implement the project without amending those standards and guidelines, the DEIS presents no basis for the public to understand the significance of impacts that may result from the amendments	(180-16) The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). "The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed "(36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all

themselves. In addition, the Forest Service unreasonably excluded alternatives that meet the purpose and need for action while addressing the significant issue of large tree conservation, as explained below. By failing to rigorously explore and objectively evaluate all reasonable alternatives in the DEIS, the Forest Service violated NEPA. 40 C.F.R. § 1502.14(a).

reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14).The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. Incorporating the large tree retention strategy (as written by stakeholders) was considered but eliminated from detailed study. The reasons for eliminating this alternative are described in the DEIS on pages 57-58. For example one reason for not considering this alternative to be reasonable is because the original LTRS did not provide the ability to create regeneration openings that would result in a continued imbalance of size classes - contrary to forest plan desired conditions (DEIS, page 57). We considered an alternative that would have limited mechanical treatments to 16 inch d.b.h. and less as a means to preserve large trees. This alternative was not considered reasonable because it trend the project area towards a large diameter, single story, closed-canopy forest conditions that would result in homogenous vegetation structure at the landscape scale (DEIS, page 59). We considered an alternative that would have limited mechanical treatments to 8-inch d.b.h. This alternative was not considered reasonable because the post-treatment condition would result in large, continuous tree groups with little variety in size or shape and little interspace. In both the short and long term VSS 3, VSS 4, VSS 5 and VSS 6 would continue on a trajectory away from desired forest

structure (DEIS, pages 48-49). In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52(DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides

Lininger, Jay	Most old growth forests that historically existed in the project area and throughout the Southwestern Region were eliminated by logging (Covington and Moore 1994). The ecological significance of old growth habitat and large trees that comprise their structure is amply documented (e.g., Friederici 2003, Kaufmann et al. 1992). Large tree removal is not necessary or beneficial to restoration of fire-adapted forest ecosystems (Arno 2000, Allen et al. 2002).	the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of the FEIS. (180-17) We agree that old trees are an important component. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range". The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees

would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634.In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.We reviewed the citations included in the comment. The closest references in Arno (2000) that could be considered relevant to this discussion are on page 103 of Arno (2000): Silvicultural cutting and pile burning or removal of excess small trees may be necessary to allow successful application of prescribed fire and to return to more open structures dominated by

vigorous trees of seral species (Arno and others 1995a)". In this context, the assumption is, apparently, that the discussion of 'removing small trees' implies that no other trees should be removed. There is no discussion of 'large' trees in Arno (2000). In the two papers cited within Arno (2000) (which CBD did not cite (Arno and others 1995a and Arno and others 1995b)), the only reference to 'large' trees is of trees greater than 30 inches in diameter. Additionally, those two papers specifically discuss ponderosa pine in western Montana, where fire regimes in ponderosa pine are significantly longer than in the southwest, and forest structure would, therefore, differ somewhat from ponderosa pine forests with more frequent fire regimes. Arno (2000), states: "…ponderosa pine type in western Montana, mean fire intervals averaged between 25 and 50 years (Arno and others 1995b.) "Failed attempts to restore more natural stand conditions with prescribed burning alone may result from inappropriate use of fire as a selective thinning tool in dense, fire-excluded stands or from burning too little or too much of the accumulated forest floor fuels". This is one of the few references to thinning in the papers cited by Arno (2000) and, clearly, does not support any specifics in regards to tree size and thinning. "The frequent disturbance cycles can also produce and maintain large old trees characteristics of pre- 1900 forests and of high value…using a modified selection system and periodic burning can be used to maintain remnant old growth stands and to create future old growth (Fiedler 1996, Fiedler and Cully 1995)." We agree that frequent disturbance (in the form of fire) can produce and maintain large, old trees, and that large, old trees were a dominant characteristic of historic forests in the project area. Pages 104 to 120 of this reference discuss Redwoods, Oregon Oak Woodlands, Doug-fir, California Red Fir, and other forest types that do not occur in the project area. Allen et al., 2002, mentions 'large' trees in the following contexts: "Uncertainties in the reconstruction of forest stand composition and spatial structure result from missing evidence, such as logs and stumps removed by fire, logging, and decay (M. M. Moore, D. W. Huffman, W. W. Covington, J. E. Crouse, P. Z. Fule, and W. H. Moir, unpublished report to USDA Forest Service, Rocky Mountain Station, Flagstaff, Arizona). Reconstruction of the density and location of large trees is far more reliable than of small-diameter stems and seedlings that decompose rapidly…" We agree with

this statement. The ephemeral quality of seedlings and saplings is attributable to the disturbance regime (including fire), and leaves few tangible signs. Old trees and large trees were more likely to leave evidence as to what their historic role/s were in forest structure, as well as a record of some components of climate and disturbance in the form of tree rings and fire scars. “Utilize existing forest structure. – Restoration efforts should incorporate and build upon valuable existing forest structures such as large trees and groups of trees of any size with interlocking crowns…Since evidence of long-term stability of precise tree locations is lacking, the selection of “leave” trees and tree clusters in restoration treatments can be based on the contemporary spatial distribution of trees, rather than pre-1900 tree positions. Historical forest structure conditions can be restored more quickly by maximizing use of existing forest structure. Leaving some relatively dense within-stand patches of trees need not compromise efforts to reduce landscape-scale crown fire risk.” The proposed treatments in 4FRI do exactly this, and are described in more detail in the implementation guide (Appendix D in the DEIS). The existing condition of the project area includes areas where trees have grown large by CBD definitions (>16” dbh), though they may be decades or even centuries younger than other trees nearby – which may actually have a smaller dbh. The proposed treatments distinguish between ‘old’ trees and ‘large’ trees, as described in this example from the Implementation Plan on page 614 of the Implementation Plan (Appendix D in the DEIS):“Manage for the sustainability of individual/isolated old ponderosa pine trees as defined in the old tree implementation strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to 18 inches dbh that do not meet the old tee definition and whose crowns are outside the old tree crown drip line: (1) within a 50-foot radius that are in the intermediate or suppressed crown positions and (2) that would eliminate direct crown competition on two of the four sides of the old tree. No trees larger than 24-inch dbh would be cut". As you know, we incorporated the Old Growth Protection and Large Tree Retention Strategy (OGPLTRS), developed by the Stakeholders, into the Implementation Plan included in the DEIS (DEIS, chapter 2, appendix D). The Plan describes in detail the conditions under which trees greater than 16” could be cut if necessary

Lininger, Jay	Landscape-scale assessment of ecological conditions and wood supply in ponderosa pine forests of northern Arizona identified a "zone of agreement" in which forest management is likely to proceed with little or no controversy (Hampton et al. 2008). To comply with NEPA, 40 C.F.R. § 1502.14, and better meet the purpose and need for this proposal, the Center encourages the Forest Service to study, develop and describe action alternatives in detail that maximize retention of existing large trees (>16-inches diameter) outside of a wildland-urban interface ("WUI") zone that includes forest lands located onequarter (¼) mile distant from established residential and other essential community infrastructure.	to meet treatment objectives. "In Southwestern ponderosa pine ecosystems this means reducing tree density and ladder fuels along with associated crown fire risk, protecting large trees, restoring surface fires, and increasing herbaceous ground cover and overall biodiversity levels…Existing forest structures, such as tree groups and large trees, should not be removed simply to recreate historical tree spatial patterns…" We are distinguishing between large trees and old trees and, as written in the DEIS and the implementation plan (appendix D), there are only two conditions under which an old tree may be cut (safety or the expectation of greater ecological disturbance if the tree is not cut). Conditions under which trees >16" dbh) MAY be cut if needed to meet treatment objectives are specified as described in the implementation plan, and would be evaluated on a site by site basis. Finally, refer to CBD's comment letter, page 11, paragraph 29 which states "it meets the purpose and need by actively managing hazardous fuels and forest structure, even to the extent that it specifically allows for removal of large trees in limited circumstances, as distinct from a broad "diameter cap." While this does not give specifics for when/which trees should be cut, it clearly implies that sometimes large trees will need to be cut. (180-18) We have worked with stakeholders including your organization, Grand Canyon Trust, Eastern Counties Organization and Navajo and Gila County to clarify comments surrounding large tree retention. In response to comments on the DEIS, the FEIS includes specific guidance related to large tree retention on areas with a preponderance of large, young trees in alternative C and E. This applies to northern goshawk habitat outside of wildland urban interface areas as is suggested within the Northern Arizona Wood Supply study. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback

Lininger, Jay	Live conifer stems larger than 16-inches diameter are extremely rare at a landscape scale in ponderosa pine forests of the Southwestern Region. According to Forest Service data, live trees larger than 16-inches diameter comprise approximately three percent (3%) of ponderosa pine forests in Arizona and New Mexico (USDA 1999, USDA 2007a). The same data indicate that more than eighty-two percent (82%) of ponderosa pines in the region are smaller than 11-inches diameter; approximately ninety-six percent (96%) are smaller than 15- inches; and less than one-tenth of one percent (.01%) are larger than 21-inches (Table 1). Clearly, the size distribution of trees is heavily skewed toward small-diameter stems, and this condition is dramatically different from historical conditions (Fulé et al. 1997). Given the rarity of large trees and the overabundance of small trees, a high burden of justification applies to a proposed action that would remove trees larger than 16-inches diameter in a project framed	and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.The DEIS vegetation analysis displays the expected change in size classes on pages 134-137 (MSO). For alternatives B-D the DEIS at page 140 addresses both large tree and old forest structure that would be sustained over time across the landscape, “Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats”. In the FEIS the large tree/old forest structure analysis has been completed for alternatives B-E. Also see the response to comment 180-17 for additional management requirements for old and large trees. The 4FRI project is focused on restoring historically characteristic uneven-aged forests, not the further development of uncharacteristic forests with one dominant age class. Management that focuses strictly on large tree retention would result in unnatural, homogenous, and unsustainable forest landscapes dominated by mature forests everywhere. This historically unprecedented condition would be subject to large-scale and severe losses of forest vegetation over time due to insects, disease, wildfire and senescence. Removal of some large trees is necessary in order to improve resilience and sustainability of the forest. Please see our previous responses on why alternatives that would have preserved large trees were considered but eliminated from detailed study. However, in response to comments on the DEIS, the purpose and need section of Chapter 1 that discusses the desired condition for large trees was updated and edited. The FEIS states, "While some large trees would be removed to accomplish ecological

	around a purpose and need to increase forest resiliency. See DEIS at 8-9; also see id. 675 (large and old trees are “rare” in the project area).	objectives or public safety objectives around communities, there is a need to retain as many large trees (larger than 16 inches d.b.h.) as possible. There is a need to recognize the rarity and ecological and socio-political importance of large trees in the Southwest and to develop a process that addresses large tree retention during project implementation". Also see our previous responses on how the project conserves and promotes large and/or old trees.
Lininger, Jay	The Forest Service is in possession of the collaboratively-designed Old Growth Protection and Large Tree Retention Strategy (“Strategy”) developed by public stakeholders, including the Center, for implementation in 4FRI forest treatment projects.[4][4] The Strategy is an agreement-based outcome and product developed in recognition that translation of such agreement can greatly enhance the likelihood of successful implementation, and reduces the risk of conflict. See DEIS at 37 (“If the [Strategy] is not incorporated [into 4FRI], the current social support for landscape-scale restoration may be withdrawn. In addition, it may result in the removal of key ecosystem components that include nesting and roosting habitat and large woody debris that is important for wildlife.”). Given the enormous commitment of stakeholder time and energy to collaborative development of the Strategy, and its clear importance to the Forest Service’s ability to implement the project, it is reasonable to study, develop and describe in detail (rather than mention and dismiss) a standalone action alternative based on the entire Strategy as it was designed.[5][5]	(180-20) See our previous responses. The DEIS, pages 56-57, provides rationale on why it was not reasonable to incorporate the original LTRS as written into the preferred alternative (alternative C). Table 15 on page 60 provides a comparison between the original large tree retention strategy and the modified large tree implementation plan (included in alternative C in the DEIS and in alternative C and E in the FEIS). On pages 57-61 the DEIS describes an alternative considered but eliminated that would have limited mechanical treatment to 16-inch d.b.h. as a means to preserve large trees.
Lininger, Jay	The DEIS eliminates from consideration an alternative that would “utilize the original large tree retention strategy.” DEIS at 48; also see id. 56 (alternative based on stakeholder Strategy “was not analyzed in detail”). Instead, Alternative C incorporates “key components” of the Strategy in its “implementation plan.” Id. 47; also see id. 48 (“A modified version of the original stakeholder developed large tree retention strategy is only applicable to the implementation plan in alternative C”) (emph. added).	(180-21) See our previous responses. The large tree implementation plan is incorporated into alternative C and E in the FEIS.
Lininger, Jay	In the implementation plan for Alternative C, the Forest Service selectively interprets and significantly revises the Strategy. In particular, the agency misapplies its precautionary “exception categories” for large tree removal as affirmative commands to mine	(180-22) See our previous responses. The implementation plan for all action alternatives (alternatives B-D in the DEIS and alternatives B-E in the FEIS) includes an Old Tree Implementation Plan (DEIS Appendix D – Section C; Pg. 644-645). There is nothing in this plan that indicates

large trees from the landscape. See id. 708-709 ("Exception categories include the WUI and the following ecological sites where young tree encroachment is inhibiting ecological function: seeps and springs, riparian areas, wet meadows, grasslands, aspen forest and woodland, pineoak forest, within-stand openings, and heavily stocked stands (with a high basal area) generated by a preponderance of large, young trees. Elsewhere, those trees would be retained…"). The Forest Service's interpretation of the Strategy ignores the express intent of 4FRI stakeholders that old growth forest should be retained in all instances and large, postsettlement trees generally should be retained in most instances except where explicitly defined circumstances, ecological objectives and selection criteria apply at site-specific scales. The stakeholders plainly did not intend to apply a blanket exemption to the Strategy in all of the contexts listed by the Forest Service (4FRI Stakeholders 2011: 3) ("'The Path Forward'—a foundational document of the 4FRI—calls for blanket old growth protection, regardless of tree size. It states that, 'No old-growth trees (pre-dating Euro-American settlement) shall be cut.' The document also includes broad recommendations for retaining large post-settlement trees with some carefully specified exceptions."). The implementation plans for Alternative C related to old trees and large trees contain none of the criteria proposed by the stakeholders, and replace them with "desired conditions" that allow unlimited management discretion to remove old and large trees. See DEIS at 644 ("Exceptions would be made for threats to human health and safety, and those rare circumstances where the removal of an old tree is necessary in order to prevent additional habitat degradation."); 646 ("There may be additional areas and/or circumstances where large post-settlement trees need to be removed in order to achieve restoration objectives."). As a result, the Forest Service has divided the 4FRI stakeholders on the question of whether to support the agency's reinterpretation of the collaborative Strategy, which may result in jeopardy to the project.

"unlimited management discretion to remove old trees". In fact, it is in close alignment with stakeholder-produced documents concerning old tree retention and clearly states that: "Old trees (approximately >150 years old) would be retained, with few exceptions, regardless of their diameter, within the 4FRI on the Coconino and Kaibab NF's EIS area. Removal of old trees would be rare. Exceptions would be made for threats to human health and safety and those rare circumstances where the removal of an old tree is necessary in order to prevent additional habitat degradation. Old trees would not be cut for forest health issues or to balance age or size class distributions. "With regards to the Modified Large Tree Implementation Plan (DEIS Appendix D – Section D, page 646), it does state, "The plan may not include every instance where large post-settlement trees may be cut. There may be additional areas and/or circumstances where large post-settlement trees need to be removed in order to achieve restoration objectives." It states, "During implementation (prescription development), if a condition exists that does not the meet the desired conditions included in this strategy, no large trees would be cut until the NEPA decision is reviewed by the Forest Service implementation team. The team would decide whether the action is consistent with the analysis and the decision made. This information would be made part of the annual implementation plan checklist/compliance review that is recommended by the team and approved by the forest supervisor." It is inaccurate to conclude that this sort of safeguard against removal of large trees could be construed as "unlimited management discretion to remove large trees". Due to response to comments and work to clarify comments surrounding large tree retention with CBD, GCT, ECO and Navajo and Gila Counties, there is specific guidance related to large tree retention on areas with a preponderance of large, young trees within alternative C and E in the FEIS in northern goshawk habitat outside of wildland urban interface areas. The clarification of comments has added language within the FEIS in the purpose and need desired condition section of Chapter 1 that discusses the desired condition for large trees as follows "There is a need to recognize the rarity and ecological and socio-political importance of large trees in the Southwest and to develop a process that addresses large tree retention during project implementation."(FEIS Chapter 1), and ties the project to the guidance

Lininger, Jay	The Forest Service advances an arbitrary and capricious rationale for excluding the collaborative Strategy as an action alternative from this DEIS. The first reason given is that it would not allow creation of "regeneration openings" in two of the eight ecological settings that comprise "exception categories" (i.e., within-stand openings and stands dominated by large, post-settlement trees). Id. 57. The DEIS fails to explain why regeneration openings need to be created in those ecological settings. It demonstrates that large trees are extremely rare in the project area. See id. 12-13 (Tables 4 and 5 showing deficit of VSS 5 and VSS 6 distribution relative to forest plan desired conditions); id. 12 (in "all stands" of ponderosa pine forest outside of goshawk post-fledging areas ("PFA"), "[T]he young and mid-aged forest structural stages are surplus, and the grass/forb/shrub, seedling/sapling, mature, and old forest stages are deficit relative to forest plan direction," and PFA habitat is dominated by "young and mid-aged forest structural stages with very little representation of the other structural stages. VSS 3 and 4 are overrepresented and VSS 1, 2, 5, and 6 are deficit."). Created openings that remove large trees from existing VSS 5 and VSS 6 structural stages will exacerbate the deficit of mature and old forest in the project area, perpetuate the "imbalance of size classes," undermine "movement toward sustaining the older, larger trees," and hinder "tree recruitment into the largest size classes." Id. 57.	within the Omnibus Public Land Management Act (created Collaborative Forest Restoration Act) which outlines that the focus of these projects is removal of small trees. (180-23) See our previous responses which provides information on where the evidence, facts, and logic related to the alternatives considered but eliminated from detailed study can be found in the DEIS. In addition, the DEIS (Chapter 2, page 57) provides an explanation for the need to recruit seedlings in parts of the treatment area through the use of group selection. In summary, the necessity in removal of trees greater than 16 inches lies in the need to alter landscape level structure, pattern and composition and move toward desired conditions. We have documented, through the modified LTRS under what circumstances it would be appropriate to remove trees greater than 16 inches as part of reaching the desired conditions. The circumstances documented by the stakeholder group in the LTRS are all included in the modified LTRS. This project has always been focused on restoring ponderosa pine forests; it is not a fuels reduction project. In ponderosa pine, there is an overlap between restoration treatments and fuels reduction treatments. For example, fuels treatments often include thinning stands so trees that are evenly spaced, and 'thinning from below'. While that may change potential fire behavior and effects to something closer to the natural fire regime for a decade or so, it is not a restoration treatment. The project is addressing the structure of the entire forest – vertically and horizontally, which changes fire behavior and effects, while putting the forest on a trajectory towards a more resilient, historic condition. There is heterogeneity within the forest as well, so there would be no 'one size fits all' prescription for fire or mechanical treatments. Thinning of both canopy and ladder fuels is generally needed to reduce crown fire potential (ERI Working Paper #15 "Effects of Forest Thinning Treatments on Fire Behavior" Feb 2006). The Landscape Strategy that was written by the Stakeholders heavily influenced the final EIS. Regarding the need or purpose of regeneration openings, the implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes

guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing

Lininger, Jay	The agency's appeal to forest plan requirements for "within stand openings" as a basis for excluding the Strategy as an action alternative in this DEIS is particularly specious because the project-specific desired conditions that drive treatment design in all of the	an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. The analysis for MSO indicates that the post treatment average trees per acre (TPA) 18 inches and greater is higher in all action alternatives within target/threshold and protected habitat and slightly lower in restricted other habitat compared to the no action alternative TPA (Silviculture Specialist Report Tables 31, 45, 61 and 71). The old growth analysis shows that the post treatment overall average trees per acre (TPA) 18 inches and greater is less than the desired minimum of 20 TPA within allocated old growth acres in all action alternatives as well as the no action alternative. The analysis projects the overall average for all alternatives will meet or exceed the desired minimum by the year 2050 (Silviculture Specialist Report Tables 38, 52, 63 and 75). The VSS distribution analysis for goshawk habitat demonstrates higher overall percentages in the VSS 5 and 6 classes post treatment for all action alternatives than the no action alternative (Silviculture Specialist Report Tables 34, 35, 36, 37; Tables 48, 49, 50, 51; Table 62; Table 74). The VSS distribution effects analysis in the vegetation (page 131 and tables 45 and 46) clearly shows a more balanced post treatment VSS distribution for all action alternatives compared to existing and the no action alternative including substantial gains in the VSS 5 and 6 classes. (180-24) We disagree. The Large Tree Retention Strategy from the stakeholders identifies the need to retain large post-settlement trees, but also recognizes the need to remove some large post-settlement trees. Specifically, the strategy states the following: "The Path Forward

action alternatives are based on proposed forest plan amendments. See id. 61 (“crosswalk” analysis); 64 (Alternative B plan amendments); 81-82 (Alternative C plan amendments); 88- 89 (Alternative D plan amendments); 440 (Table 91 displaying forest plan amendments for all action alternatives that (1) add desired percentage of interspaces within uneven-aged stands, (2) add interspaces distance between tree groups, (3) add language regarding canopy cover measurement, (4) allow 29,017 acres on Coconino NF and 27,637-to-27,675 acres on Kaibab NF to be managed for open reference condition, and (5) add definition to forest plan glossaries for the terms, “interspaces,” “open reference condition,” and “stands.”). The forest plans, as they are currently written, contain no direction regarding “interspace” and “open reference condition.” The Forest Service fails to articulate any divergence of the collaborative Strategy from desired conditions in the existing forest plans or, in the alternative, to propose plan amendments that would accommodate implementation of the Strategy and a hard comparative look at environmental impacts. Staking action alternatives on proposed amendments to the forest plans while eliminating the Strategy from detailed consideration as an action alternative based on alleged plan violations unsupported by the analysis is arbitrary and capricious.

also calls for retaining large post-settlement trees (defined by the socio-political process as those greater than 16 inches diameter-at-breast height [dbh]) throughout the 4FRI landscape, except: (1) as necessary to meet community protection and public safety goals within the Community Protection Management Areas identified in the Analysis of Small Diameter Wood Supply in Northern Arizona and where stakeholder agreement identifies priority areas within approved CWPPs; and (2) when best available science and stakeholder agreement (as defined in the 4FRI Charter) identify sites where ecological restoration and biodiversity objectives cannot otherwise be met – specifically wet meadows, seeps, springs, riparian areas, encroached grasslands, aspen groves or oak stands, within-stand openings, and heavily stocked stands with high basal area generated by a preponderance of large, young trees "(LTRS, page 4).The DEIS used the best available science that determined northern Arizona ponderosa pine forests have interspace (Chapter 1, Tree Density and Canopy Openness section on page 9 DEIS), hence the need for the forest plan amendments in the DEIS. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project’s desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF’s plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Amendment 2 in the FEIS for the Coconino NF clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest

Lininger, Jay	The second reason given for eliminating the Strategy as an action alternative is because the Forest Service does not wish to consult stakeholders "should a new exception category be found during implementation." Id. The agency introduces the possibility of a "new exception category," but the Strategy does not address this possibility. Rather, it states, "[T]he stakeholder group considers the guidance offered for these exception categories sufficient to operationalize large tree retention/removal per these criteria across the 4FRI area" (4FRI Stakeholders 2011: 25). The Strategy holds out the possibility that, "The 'Large Young Tree' exception category listed in this document will require additional collaborative analysis and clarification," but it clearly does not anticipate the emergence of any "new exception category" during implementation. Also see DEIS at 58 (54,358 acres of project area outside of Strategy exception categories "do not necessarily mean a new category has to be developed," and "based on the vegetation data [] these acres could be moved toward desired conditions without needing to cut trees larger than 16-inch d.b.h."). Once again, the Forest Service arbitrarily distorts the Strategy and fails to supply a good-faith response to controversy over the removal of large and old trees.	(180-25) The record demonstrates that collaboration was essential to the development of the proposed action and alternatives (DEIS, chapter 1 and 2, DEIS, appendix D, appendix E, appendix G) (FEIS, chapter 1, FEIS appendix D, FEIS appendix E, FEIS appendix G, FEIS appendix I) and the issue of large trees was addressed. See our previous responses. Due to concerns raised in the response to comments on the DEIS, we worked with your organization, the Grand Canyon Trust, the Eastern Counties Organization and Navajo and Gila Counties to develop specific guidance related to large tree retention on areas with a preponderance of large, young trees. This guidance is specific to alternative C and E in the FEIS in northern goshawk habitat outside of wildland urban interface (WUI) areas. This is consistent with the Northern Arizona Wood Supply recommendations for areas outside of WUI, with the current Kaibab NF forest plan, the Coconino NF forest plan with the proposed amendments and the purpose and need of the project (DEIS, chapter 1). In response to comments on the DEIS, large tree language was added to the purpose and need (FEIS, p. 15): The Omnibus Public Land Management Act outlines criteria for landscape-scale restoration on National Forest System lands. The Act directs landscape restoration projects funded under this authority to focus on the removal of small diameter trees. Tables 4 through 7 (see previous pages) display that large trees (VSS 5 and 6) are currently under-represented within the project area. The desired condition is to balance community, wildlife, and forest restoration into treatment design. While some large trees would be removed to accomplish ecological objectives or public safety objectives around communities, there is a need to retain as many large trees (larger than 16, inches d.b.h.) as possible. There is a need to recognize the rarity and ecological and socio-political importance of large trees in the Southwest and to develop a process that addresses large tree retention during project implementation. We have addressed the conservation of both old and large, young trees. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641 (web-based version of the DEIS). Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree

implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain the desired tree cover range. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section (see details described above). The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA

WUI55, UEA 40, UEA 25 and UEA 10 section. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

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The third reason given for excluding the Strategy as an action alternative is because "[M]ovement toward the desired condition in pine-oak was constrained to [Mexican spotted owl] habitat. This would preclude moving toward desired conditions in non-MSO habitat." DEIS at 57. In fact, the Strategy includes exception criteria for large tree removal in pine oak forest both "in MSO restricted habitat" and "outside MSO restricted habitat" (4FRI Stakeholders 2011: 20). Apart from its clearly false characterization of the Strategy regarding pine-oak forest, the Forest Service fails to recognize its own definition of "restricted areas" under the amended Forest Plans (USDA 1995), which "include all mixed conifer, pine-oak, and riparian forests outside of protected areas" (Fletcher et al. 2012: 31) (emph. added); also see id. 58 ("Ponderosa pine – Gambel oak habitat is managed as Restricted Habitat under the MSO Recovery Plan…"). As a matter of policy, there is no such thing as "non-MSO habitat" in pine-oak forest.

See response to comment 180-17, 18, 20-26. The DEIS displayed 3 action alternatives (B-D) that included forest plan amendments that relate the project's purpose and need to use the best available science for restoration treatments (relevant to the existing conditions within the project area). The DEIS explains why the amendments are needed, and how the forest plan amendments would be implemented (DEIS Appendix B). These amendments have been analyzed, and the effects are disclosed in this DEIS (DEIS, chapter 3). There is a discussion of project consistency with forest plan requirements and specific statements that the plan requirements would be met during project implementation. The DEIS includes design criteria that demonstrate how this would be accomplished (DEIS appendix D, section A). With that being said, the FEIS analyzes fully an action alternative that does not include forest plan amendments (Alternative E in the FEIS). Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan (see FEIS, forest plan consistency section). Three non-significant forest plan amendments continue to be proposed on the Coconino NF in alternatives B-D. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy

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Finally, the Forest Service opines that the Strategy's exception categories would cover most of the project area, and that modifying them into "desired conditions" made it "easier to translate them into treatment designs." Id. 57-58. Again, those project-specific desired conditions and treatment designs are based on proposed forest plan amendments that are unique to the action alternatives developed by the agency. See id. 60-61 (Table 15); 440 (plan amendments); 610-639 (desired conditions and treatment designs incorporate plan amendments). The Forest Service fails to take a hard look at impacts of a reasonable action alternative that would implement the existing forest plans as written. In the alternative, it fails to propose other plan amendments to accommodate implementation of the collaborative Strategy. Both failures are arbitrary and capricious.

cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project.

Lininger, Jay	The collaborative Strategy, as presented by stakeholders to the Forest Service, is a reasonable alternative to the proposed action, which the Forest Service was required to fully analyzed as an alternative in the DEIS, for additional reasons. First, it meets the purpose and need by actively managing hazardous fuels and forest structure, even to the extent that it specifically allows for removal of large trees in limited circumstances, as distinct from a broad "diameter cap."[6][6] Second, the Strategy avoids significant cumulative impacts that may result from excessive and unnecessary removal of large, fire-resistant trees, which are deficient in the project area and in the Southwestern Region as a whole (USDA 1999, USDA 2007a). More, it mitigates adverse effects to threatened and sensitive wildlife species that require closed canopy forest habitat for essential life behaviors. Each of the above reasons is explained in further detail below.	The DEIS fully discloses that rationale for not including an alternative that used the original LTRS. See pages 56-58 of the DEIS and table 15 of the DEIS (pages 60-61). Also see our previous responses regarding the conservation of large trees.
Lininger, Jay	Large tree retention is fundamentally important to restoration of fire-resilient forests (DellaSala et al. 2004). Large ponderosa pine and Douglas-fir trees possess autecological characteristics such as relatively thick bark and insulated buds that promote resistance to heat injury (Arno 2000, Weaver 1951). Self-pruning mature ponderosa pines feature high branch structure and open canopies, which discourage torching behavior (Keeley and Zedler 1998). Finally, mature ponderosa pines have a high capacity to survive and recover from crown scorch (McCune 1988). Thus, large tree structure enhances forest resistance to severe fire effects (Arno 2000, Omi and Martinson 2002, Pollett and Omi 2002), whereas removing them may undermine forest resilience (Brown et al. 2004, Countryman 1955, Naficy et al. 2010).	(180-29) We agree that larger trees are important to the landscape, see the FEIS, purpose and need, forest structure-large trees section (FEIS, p. 15). As an added post treatment benefit, the large trees will be more sustainable and less susceptible to loss from density related mortality and other threats such as insects, disease and uncharacteristically severe wildfire. The vegetation analysis is focused on determining whether, or to what degree, the project meets purpose and need objectives. It responds to two key issues, one of which is conservation of large trees (Issue 2). The analysis provides a quantitative pre-treatment and post-treatment three level analysis for Mexican spotted owl (MSO), goshawk, old growth, and vegetation structural stage (VSS) for goshawk habitat at the landscape scale (ponderosa pine vegetation type) to gauge movement towards restoration desired conditions (Silviculture Specialist Report, Pg. 7). For example: The analysis for MSO indicates that the post treatment average trees per acre (TPA) 18 inches and greater is higher in all action alternatives within target/threshold

and protected habitat and slightly lower in restricted other habitat compared to the no action alternative TPA (Silviculture Specialist Report Tables 31, 45, 61 and 71). The old growth analysis shows that the post treatment overall average trees per acre (TPA) 18 inches and greater is less than the desired minimum of 20 TPA within allocated old growth acres in all action alternatives as well as the no action alternative. The analysis projects the overall average for all alternatives will meet or exceed the desired minimum by the year 2050 (Silviculture Specialist Report Tables 38, 52, 63 and 75). The VSS distribution analysis for goshawk habitat demonstrates higher overall percentages in the VSS 5 and 6 classes post treatment for all action alternatives than the no action alternative (Silviculture Specialist Report Tables 34, 35, 36, 37; Tables 48, 49, 50, 51; Table 62; Table 74). Please note, the sentence provided in the comment "Finally, mature ponderosa pines have a high capacity to survive and recover from crown scorch"(McCline 1988) is not supported at all by McCune 1988. The paper discusses the characteristics of various groups/species of pine, but does not discuss the capacity of any of them to survive crown scorch at any age. It does not discuss crown scorch at all. Naficy et al. (2010) describe a difference in forest structure between areas that were logged and had fire exclusion, and areas that were logged prior to 1960 and had fire exclusion. Their data show that areas that were logged and had fire "…have higher average stand density, greater homogeneity, more standing dead trees, and a greater abundance of fire-intolerant trees than the unlogged, fire-excluded stand…propose that ponderosa pine forests with these distinct management histories likely require a distinct restoration approach…" However, this research was done in the northern Rockies, and the response could be different in southwestern ponderosa pine and the associated climate. The 4FRI proposed treatments were developed stand by stand, to take into consideration the conditions of each stand, as well as soil type, landscape patterns, and special designations (such as MSO habitat). Omi and Martinson (2002) found that diameter and height are critical variables associated with tree resistance to fire damage, and that' "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management'. They also concluded that 'crown fire propagation is dependent on the

Lininger, Jay	Research demonstrates no advantage in fire hazard mitigation resulting from treatments that remove large trees compared to treatments that retain them. Treatments that removed only trees smaller than 16-inches diameter were marginally more effective at reducing long-term fire hazard than so-called “comprehensive” treatments that removed trees in all size classes (Fiedler and Keegan 2002). Thinning small trees and pruning branches of large trees to increase canopy base height significantly decreases the likelihood of crown fire initiation (Graham et al. 2004, Keyes and O’Hara 2002, Omi and Martinson 2002, Perry et al. 2004, Pollett and Omi 2002), which is a precondition to active crown fire behavior (Agee 1996, Graham et al. 2004, Van Wagner 1977). Low thinning and underburning to reduce surface fuels and increase canopy base height at strategic locations effectively reduces fire hazard at a landscape scale and meets the purpose and need.	abundance and horizontal continuity of canopy fuels…’ The proposed treatments in 4FRI are intended to restore, or put on a trajectory towards restoration of, historic forest structure, including groups and interspaces. The interspaces would be expected to provide sufficient discontinuity in canopy fuels so that, if a group of trees experienced crown fire, it would drop to the ground before the fire reached another group of trees. (180-30) Please see our previous response (180-29). In places where large trees potentially would be removed, the objective would not be ‘fire hazard mitigation’…or anything very close to that. It would be restoration of forest structure, which would have a side benefit of improving potential fire behavior and effects. The description in the comment about cutting small trees and pruning branches of large trees is described as ‘thinning from below’, and has few applications to restoration. If this was done at a landscape scale, there would be large areas of closed-canopy forest as these areas continued to mature, and the canopies continued to close up. Pollett and Omi (2002) determined that removing small diameter trees may be beneficial for reducing crown fire hazard. This research was specifically done in reference to fuels treatments and, though the principle is clearly sound in regards to a method of reducing the immediate potential for crown fire initiation, it is not a prescription for how to implement restoration of ponderosa pine ecosystems. There is an important difference between groupy stand structure with interspaces and even- aged removal of small trees. The Fire and Fuels extension to the Forest Vegetation Simulator as used in the fire behavior/fuels analysis and in the Fiedler and Keegan 2002 study cited here by CBD is not spatial, which makes it unable to quantify changes in spatial distribution of fuels. It can only provide stand averages, so that fuel characteristics are modeled as if they are evenly distributed across a stand. FlamMap outputs are spatial and, by using Landfire data, fire behavior can be represented across a 30m x 30 m grid. Finney (2001) assumes a post treatment fuel model that will not readily carry fire. This is not a result expected or observed in project area ecosystems and therefore is not applicable to this project. Additionally, Finney’s analysis was conducted specifically with an objective of reducing fire behavior and hazard, not restoration. The removal of few larger trees may sometimes be needed to meet

Lininger, Jay	Large trees are not abundant at any scale in ponderosa pine or mixed conifer forests in the Southwestern Region (Covington and Moore 1994, Fulé et al. 1997, USDA 1999, USDA 2007a, USDI 1995). They are the most difficult of all elements of forest structure to replace once they are removed (Agee and Skinner 2005). The ecological significance of old growth forest habitat and large trees comprising it is widely recognized (Friederici 2003, Kaufmann et al. 1992). There is no scientific basis for extracting large trees to promote fire resistance in ponderosa pine and mixed conifer forest (Allen et al. 2002, Brown et al. 2004, DellaSala et al. 2004).	treatment objectives for improving habitat and/or restoring the structure, pattern and/or composition of the landscape. Furthermore, these cited studies (Pollet and Omi 2002) deal specifically with fuels reduction while the objectives of the project are to restore composition, structure and functions that support ecological functions across the landscape. Prescribed fire will be used along with thinning with the expectation that it would raise canopy base heights, address surface fuels, and thin seedlings and some small saplings as indicated in the Finney 2001 study, along with multiple other functions of fire that are discussed in the Fire Ecology Report. This project was planned using site-specific (stand-level) forest vegetation/fuels data. The effects of the alternatives on stand structure and fire behavior have been examined and disclosed using this site-specific information as the basis for the analysis. The best available science, methodology and analysis tools were utilized (Forest Vegetation Simulator and the Fire and Fuels Extension for forest vegetation and fuels, Flammap for fire behavior, and numerous other models and data described in detail in the Fire Ecology and Air Quality Report in the 'Methodology' section). This analysis documents decreases in undesirable fire behavior and effects for alternatives B, C, and D. This analysis is far more relevant to the project landscape than the non-local research that has been provided in this comment. Also see our response to comment 180-29. 180-31. Please see our previous responses on the conservation of old (and large) trees. Our previous responses also address Allen et al. 2002. Comments addressing mixed conifer are not pertinent to this proposed action since there are no treatments proposed in mixed conifer. Brown et al. 2004 state "Diameter limits, such as restricting removal to trees <30 cm (12") or <50 (20") cm is one way to approach the problem, but the limit should vary by site. Trees that invaded some forests after fire exclusion became effective can exceed 50 – 60 cm (20 – 24") diameter, whereas on other sites trees that are 200 years old can be well below this size…third principle is to decrease crown density by thinning overstory trees, making tree-to-tree crowning less probable" So, while Brown et al. 2004 explicitly do not advocate the cutting of large, fire resistant trees, they clearly do advocate the thinning of some overstory trees in some cases. Depending on the definition of 'large tree', this is likely to include some 'large' trees. DellaSala et al. 2004 discuss

Lininger, Jay	In addition to their rarity, a variety of factors other than logging threatens the persistence of the remaining large trees in Southwestern conifer forests. Prescribed fire can injure exposed tree roots that have migrated into accumulated duff layers and cause high levels of post-treatment mortality among large trees (Sackett et al. 1996). Burning of pine stands with high surface fuel loading also can produce high fireline intensities and result in large tree mortality due to cambial injury by heat (Hunter et al. 2007). Prescribed fire also may render large trees susceptible to delayed bark beetle infestation (Wallin et al. 2003). In addition, large tree mortality has indirectly resulted from mechanical thinning activities (Hunter et al. 2007). Large standing dead trees ("snags") and downed logs supply critical habitat for primary and secondary cavity-nesting species (including threatened Mexican spotted owl and its prey) and may be destroyed by fuel treatments (Hunter et al. 2007). Prescribed fire may create coarse woody habitat by killing live trees, but gains generally do not offset losses, as existing coarse wood is irretrievably destroyed (Randall-Parker and Miller 2002). Recruitment of large trees, snags and large woody debris will become more limiting over time as climate change imposes chronic drought, reduced tree growth rates, and more widespread tree mortality (Diggins et al. 2010, Savage et al.1996, Seager et al. 2007, van Mantgem et al. 2009, Williams et al. 2010).	concerns (largely credited to Brown et al. 2004) about harvesting of 'large, fire resistant trees' and all references in this paper are credited to Brown et al. 2004. A particularly clear statement: "Retention of large and old trees can be a particularly contentious issue…However, removal of large, old trees is not ecologically justified and does not reduce fire risk…". As discussed earlier, the project does not expect to be cutting old trees. There are minimal exceptions. As discussed earlier, treatments proposed under this project distinguish between large trees and old trees, with each being treated differently, and both having more restrictions than smaller and/or younger trees. Overall, we find that some of the comment conclusions are not supported by the cited papers. (180-32) Thank you for providing the list of factors that may threaten large trees in the Southwestern conifer forests. The DEIS discloses that there may be effects to residual trees from implementation activities in multiple resources and sections of the DEIS (p 52, 141, 147, 158, 243, and 307), and outlines specific design features to minimize these on pages 566, 569, 570, and 576. For clarification, broadcast burning would be conducted under conditions expected to meet treatment objectives, including minimizing damage to old trees. We acknowledge that throughout the life of this project, it is likely that some large and/or old trees would be damaged or killed by prescribed fire. It would not be possible to mitigate every large and/or old tree. However, implementation strategies are included that would mitigate these effects as documented in the DEIS Appendix B. Alternative A analyzes the potential effects of not thinning and burning. Alternative D analyzes the potential effects of just thinning in most forested areas (no prescribed fire would be implemented).Regarding snags, some minor levels of mortality of all sized trees are a normal occurrence in natural forest ecosystems, and characteristic levels of large tree mortality are desired to produce key wildlife habitat elements (snags, down logs). Treatment mitigations to limit and avoid damage to desired large leave trees have been incorporated into the project design. Implementation of this project would produce forest conditions that are far more resilient than the current condition, and therefore it is highly probable that large trees would experience greater longevity as a result of this project. Under the current forest conditions, large trees are at high risk

of accelerated mortality due to insects, disease and uncharacteristically severe fire. Some loss of snags and down logs from prescribed fire is expected and, in some cases, desired. Potential decreases are reflected in the modeled outcomes for each alternative. Current levels of woody debris exceed presettlement conditions at large scales due to anthropomorphic influences that have delayed the fire return interval and the expected reduction generally keeps woody debris at desired levels post-treatment. The exception is for snags, which currently are and would remain below forest plan levels (no target number was provided in the MSO recovery plan). Levels of post-treatment snags may actually resemble pre-settlement conditions. Ganey (1999) and Waskiewicz et al. (2007) looked at different aspects of relatively undisturbed ponderosa pine forests in northern Arizona and both found snag values well below those recommended in the forest plans(Wildlife specialist report pages 83,231, 264, 470, 602, and 608). The light treatment intensities planned in MSO protected, target, and threshold habitat should limit the losses of snags (wildlife report pages 221, 231, 254, 264, 284, 294, and 317). In addition, project design features and treatment mitigations were specifically developed to retain cavity nesting habitat (pages 595-598, W24, W32, W33, & W48). Design features include managing for dead-top and lightning-struck trees which would continue to provide MSO prey habitat in relatively fire-resistant trees (DEIS pages 595,615, 618, 621, 623, 625, 627, 629, 631, 634, and 636; wildlife report pages160, 166, 231, 264, 391, 394, 427, 433, 446, 532). In addition, there are design features for retaining oak and facilitating the retention of large-sized oak, many of which are currently overtopped by pine trees and, in some PACs, were observed to be dying out as a result of the competition(DEIS pages 610-617). Large oak provide important to MSO and their prey. Within the 4FRI area, MSO typically build stick nests in large diameter ponderosa pine. The DEIS has numerous design features for the retention and development of trees >24” dbh (DEIS page 158, W45and 610-617). Modeling indicates the preferred alternative would generate more trees greater than 24” dbh than any other alternative, including the no action alternative (DEIS page 182).While Randall-Parker and Miller (2002) found a net loss of snags, logs, and coarse woody debris after prescribed fire Waltz et al. (2003) (wildlife specialist report pages 222-223) found no statistically

significant difference in woody debris pre- and post-burning. This study was more rigorous than Randall-Parker and Miller (2002). They found mixed trends within woody debris categories and observed that the thinning component of their restoration treatments added to ground fuels. Randall-Parker and Miller (2002) only described pre-fire treatments as a pre-commercial thin strategy that removed trees <5" dbh. This is a very different treatment than Waltz et al. (2003) or the treatments proposed by the 4FRI. Post-treatment conditions could be expected to be very different from Randall-Parker and Miller (2002) as well. When drawing on the scientific literature to make comparisons, it is important to select comparable literature or else the science can be misrepresented. The bottom line is that the risk to these forest components is greater from unplanned ignitions. The proposed treatments would reduce this risk. Therefore Randall-parker and Miller (2002) article was not included in the analysis for the DEIS but will be included in the FEIS. Aside from the direct effects of treatments, climate change and its synergistic effects on other stochasticevents could actually increase the recruitment rate of large snags and logs for decades by increasing threats fromdrought, warming temperatures, tree pathogens, and insects. Ganey and Vojta (2011) documented increases in logs and snags as a result of bark beetles mediated by a long-term drought- (wildlife report page 85 and 603). However, once that cohort moves through the system, either through decay or combustion, the combination of stagnating growth rates under current forest conditions along with the accelerated loss of existing large trees could eventually reduce the availability of snags and logs in the long-term. This potential scenario adds emphasis to the need to improve the ability to grow and retain large trees. The USFWS concluded that retaining existing large trees and increasing large tree growth rates should provide for the recruitment of future large snags and logs (see the1995 MSO recovery plan, page 91 and the revised MSO recovery plan277). The 4FRI approach of retaining presettlement trees, thinning post-settlement trees, and using prescribed fire to move forest structure, pattern, and composition towards presettlement conditions is in alignment with climate change recommendations at the national, regional, and local scales (The Nature Conservancy Climate Change Adaptation Workshop 2010, USDA 2010, Leonard 2011, National Fish,

McHugh and Kolb (2003) describe unplanned and prescribed fire effects on ponderosa pine forest structure in northern Arizona reflecting a "U-shaped" tree mortality curve in which mortality was lowest among trees sized 30 – 60 centimeters ("cm") (approx. 12" – 24") diameter, and highest among the smallest trees as well as in the 75 – 80 cm (~29.5" – 31.5") diameter (Figure 3 above). Resistance to fire-induced mortality was greatest among trees sized 35 – 75 cm diameter. Mortality effects occurred despite relatively uniform "crown damage" across tree size classes, indicating that cambial injury and root scorch fire effects were most significant among the smallest and largest trees, whereas intermediate-sized trees were relatively uninjured and may have benefited from the disturbance (McHugh and Kolb 2003). A large tree retention alternative would maintain trees that are most likely to survive fire injury and supply recruitment structure that will support the recovery of old growth forest habitat in the future.

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If significant reductions of crown bulk density are necessary to meet the purpose and need then it is unlikely that the project will maintain habitat for threatened and sensitive wildlife species associated with

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Wildlife, and Plants Climate Adaptation Partnership 2012). Effects of mechanical and prescribed burn treatments were also analyzed for cavity nesters such as hairy woodpeckers and pygmy nuthatches in the Management Indicator Species section of the wildlife report. The preferred alternative would contribute to the upward forestwide trend for both species (see the MIS effects analysis in the 4FRI wildlife specialist's report (pages 426-427 and 433-435).

(180-33) We agree that larger trees are a key component to a restored landscape, but do not feel that a separate alternative is necessary, we feel it should be a component of all alternatives considered with the analysis. See our previous responses on the conservation of old and large trees. For clarification, McHugh and Kolb (2003) compared the Dauber Prescribed Fire and the Side and Bridger-Knoll Wildfires. The Dauber prescribed fire data suggested that as diameter increased, mortality decreased, but findings in the wildfires showed as diameter increased mortality increased. The DEIS addresses the expected surface, passive, and active crown fire under each plan alternative under burning parameters that would be expected to produce an undesirable fire behavior and effects under current conditions. Under prescribed fire conditions, fire behavior and effects would be significantly decreased under prescribed fire parameters. The DEIS (Appendix C, FE12 in Table 111) and the Fire Ecology, Fuels, & Air Quality Specialist Report (Appendix E) describe mitigations when burning in areas with large or old trees as follows: "When practicable, damage or mortality to old trees, and large trees would be mitigated by implementing prescription parameters, ignition techniques, raking, wetting, thinning, compressing slash, or otherwise mitigating fire impacts to the degree necessary to meet burn objectives and minimize fireline intensity and heat per unit area in the vicinity of old trees. Trees identified as being of particular concern (e.g. trees with known nests or roots for herons, eagles, osprey, or other raptors, occupied nest cores, or critical areas in PACs) would be managed in accordance with wildlife design features (see wildlife). Prepare old trees 1 year or more before a burn if possible."

(180-34) Large tree growth, development and resilience to mortality factors are best facilitated by managing for less overall forest density. Project design criteria have been incorporated to assure maintenance

closed-canopy forest (Beier and Maschinski 2003, Keyes and O'Hara 2002, USDI 1995). Large tree removal reduces forest canopy and diminishes recruitment of large snags and downed logs, which in turn affects long-term forest dynamics, stand development, and wildlife habitat suitability (Quigley et al. 1996, Spies 2004, van Mantgem et al. 2009). A large tree retention alternative would maintain wildlife habitat in the short-term and mitigate adverse direct and indirect effects of proposed treatments.

of desired canopy cover within mature tree groups during implementation that meets wildlife and habitat needs. The project has several design features (see Appendix C page 565-599 of the DEIS) that specifically speak to retaining large trees across the landscape, particularly in MSO habitat. In addition, the 4FRI adopted an old tree retention policy (see DEIS pages 644-654) regardless of tree dbh. The vegetation analysis is focused on determining whether, or to what degree, the project meets purpose and need objectives. It responds to two key issues, one of which is conservation of large trees (Issue 2). The analysis provides a quantitative pre-treatment and post-treatment three level analysis for Mexican spotted owl (MSO), goshawk, old growth, and vegetation structural stage (VSS) for goshawk habitat at the landscape scale (ponderosa pine vegetation type) to gauge movement towards restoration desired conditions (Silviculture Specialist Report, Pg. 7). For example the analysis for MSO indicates that the post treatment average trees per acre (TPA) 18 inches and greater is higher in all action alternatives within target/threshold and protected habitat and slightly lower in restricted other habitat compared to the no action alternative TPA (Silviculture Specialist Report Tables 31, 45, 61 and 71). See the wildlife analysis in chapter 3 of the DEIS for the complete disclosure.

Old growth forests differ in structure and function from younger forests. They comprise preferred habitat of many sensitive wildlife species and provide a host of ecological services including watershed function, clean water, soil retention, and storage of greenhouse gasses (Kaufmann et al. 1992, Luyssaert et al. 2008). Old growth habitat consists of large trees with fire-resistant "plated" bark structure and tall canopies, snags with nesting cavities and broken tops valuable to wildlife, as well as vertical and horizontal structural diversity within stands. Most of the former old growth forests throughout the ponderosa pine and mixed conifer formations were destroyed by logging (Covington and Moore 1994). Indeed, numerous analyses by the Forest Service and others demonstrate that logging significantly affects long-term recruitment of coarse

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wood and the availability of old growth habitat (e.g., Quigley et al. 1996, Spies 2004, van Mantgem et al. 2009).

(180-35) Please see response 180-34 for the effects of the proposed treatments on wildlife species. The silviculture section of the DEIS discloses the effects of treatments on old growth and coarse woody debris associated with old growth on page 138 of the DEIS.

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The 1996 Plan Amendment for the Southwestern Region (USDA

(180-36) The DEIS fully discloses the old growth allocation as required.

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1996) includes mandatory standards and guidelines for old growth habitat management. Each national forest, including the Coconino and Kaibab, must allocate no less than 20 percent of each forested "ecosystem management area" to old growth habitat. In order to properly determine old growth habitat, the Forest Service must refer to a specific table included sets forth detailed minimum numeric criteria for various forest types, including the size, age and number of live and dead trees, down trees and canopy cover. Forested sites must meet or exceed these numeric structural attributes in order to be considered old growth habitat. In addition, the amended forest plans require the agency to analyze old growth habitat at multiple scales: (1) the ecosystem management area; (2) one scale above the ecosystem management area; and (3) one scale below the ecosystem management area. The amount of old growth that can be provided and maintained must be evaluated at the ecosystem management level and be based on forest type, site capability and disturbance regimes. The Forest Service also must analyze and disclose how many acres within the ecosystem management area currently meet the minimum numeric criteria for old growth habitat set forth in the forest plans; assess potential impacts to old growth habitat at the required scales; allocate no less than 20 percent of each management area to old growth as depicted in the forest plans; and must not log any of the remaining large trees within the project area until it meets these mandatory requirements.

Table 22 and table 23 display the old growth allocation acres by forest, restoration unit, and vegetation type. Figure 30 displays the general location of the old growth allocation. The old growth standards for the Coconino NF states, "Until the forest plan is revised, allocate no less than 20 percent of each forested ecosystem management area to old-growth as depicted in the table below. In the long term, manage old-growth in patterns that provide for a flow of functions and interactions at multiple scales across the landscape through time. Allocations will consist of landscape percentages meeting old-growth conditions and not specific acres" The old growth guideline for the Coconino NF states, "All analyses should be at multiple scales—one scale above and one scale below the ecosystem management areas" (USDA FS 1987, page 70-1). The DEIS disclosed the scales of analysis (and rationale) on page 15. To be consistent with the Coconino NF forest plan, scales of analysis based on existing divisions of the landscape were developed specifically for the project. The smallest scale is represented at the stand level with stands averaging less than 100 acres in size. The Ecosystem Management Area (EMA) is the restoration sub-unit. Sub-units range in size from4, 000 to 109,000 acres. The scale above the EMA is the restoration unit, which ranges in size from 46,000 to 335,000 acres. Direction specific to the Coconino NF Management Area 3, Ponderosa Pine Mixed Conifer Less Than 40% Slope, Old Growth (Coconino NF Forest Plan, replacement page 127) includes direction written as a standard: "Stands managed for old-growth are 100 to 300 acres in size". For the Coconino NF, forest plan direction for goshawk, old growth, wildlife hiding and thermal cover, and timber resource management, references conducting evaluations at the ecosystem management areas (EMAs) scale. However, beyond this forest-wide direction, which is a result of the 1996 amendment of 11 forest plans, there is no additional direction in the forest plan regarding the use of EMAs. For example, there is no relationship or crosswalk between the EMA to plan management areas. Across the forest, vegetation projects that are required to stratify vegetation and habitat at a scale above and below the EMA have directly linked the EMA to a 10,000-acre (10K) block analysis. The 10K blocks have been based on stand boundaries. For those projects that exceeded 10,000 acres, the scale above the EMA was often a conglomeration of 10,000-acre units (Cote, personal

Lininger, Jay	The DEIS does not demonstrate compliance with the forest plan standards and guidelines for old growth forest described above. It defines “restoration subunits,” which range in area from 4,000-to-109,000 acres, as the equivalent of “ecosystem management areas,” and states that 194,804 acres (38 percent) of the 512,178 acres of ponderosa pine forest in the project area “are the closest to meeting old growth conditions.” See DEIS at 15- 16 (Table 8 displays “old growth allocation acres” in ponderosa pine forest); 6-7 (“restoration units”). On the basis of this information, the analysis concludes, “Currently, all restoration units meet or exceed the 20 percent	communication with Flagstaff RD 2011).Using a 10,000-acre scale would have been meaningless for a project of this size. The 10K block was used as a surrogate as a means to get to a landscape scale of analysis. A 10K analysis for this project would be too small to use for assessing impacts at the landscape and ecosystem scale. A key assumption in using the 10K block was if objectives were being met at the 10K, objectives were being met at the larger scale. There was a need to use scales which allowed for meaningful analysis from the small scale to the landscape scale. Coconino NF plan language specifically says blocks may be larger or smaller if approved by the forest supervisor. The Coconino NF supervisor may sign a project record document demonstrating the need, and rationale for, deviating from the 10K analysis (Coconino NF Forest Plan, page 70). Since the DEIS was published, the Kaibab NF revised its forest plan (USDA FS 2014). Desired conditions (paraphrased) at the fine scale include having tree groups of various age classes and size classes, having crowns of trees within the mid-aged to old groups (Kaibab NF forest plan, p. 17). The (paraphrased) desired condition at the landscape scale (over 10,000 acres) is to have old growth occur throughout the landscape as a component of uneven-aged management with the location of old growth shifting on the landscape as a result of succession and disturbance. Old growth components include old trees, snags, coarse woody debris, and structural diversity (Kaibab NF forest plan page 18). The FEIS reflects the new plan direction. The vegetation analysis in the FEIS (chapter 3) describes how the alternatives move towards desired conditions. The implementation plan (appendix D in both the DEIS and FEIS) describes in detail how treatments would be designed to protect old trees. (180-37) Please see response to comment 180-36 regarding forest plan required scales of analysis for old growth. As noted previously, since the DEIS was published, the Kaibab NF revised its forest plan (USDA FS 2014). Desired conditions (paraphrased) at the fine scale include having tree groups of various age classes and size classes, having crowns of trees within the mid-aged to old groups (Kaibab NF forest plan, p. 17). The (paraphrased) desired condition at the landscape scale (over 10,000 acres) is to have old growth occur throughout the landscape as a component of uneven-aged management with the location of old growth shifting on the landscape as a result of succession and

minimum forest plan requirement." Id. 15. However, it also states, "Most sites currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans." Id. (emph. added); also see McCusker (2013: 46-47) (Table 21 quantifies the overall lack of old growth attributes in stands allocated to "old growth").

The DEIS renders conclusions about old growth forest that contradict data in the underlying specialist reports. For example, according to the DEIS, there are 145,793 acres of ponderosa pine forest in Restoration Unit 1 ("RU1"), and 65,189 acres (45 percent) of that area contains "ponderosa pine old growth acres." Id. 79 (Table 22). However, the Silviculture Specialist Report indicates that only 6,224 acres of ponderosa pine forest in RU1 comprise Vegetation Structural Stages ("VSS") 5C (closed canopy mature forest) or 6C (closed canopy old forest) (McCusker 2013: 26-27 – Tables 5 (VSS description) and 6 (existing VSS)). Those VSS categories are the most likely to be actual old growth since they feature live trees larger than 18-inches diameter at breast height ("dbh") and canopy cover exceeding 50 percent (McCusker 2013: 33) (defining "closed" as "<25% interspace"); Fletcher and others (2012: 137) ("Old trees are assumed to be at least 18 inches dbh or larger"); id. 528-29 (desired conditions for old growth). Those VSS 5C and 6C stands comprise just four percent (4.27%) of all ponderosa pine forest in RU1. No reader can independently deduce from the given data how much additional old growth may exist in RU1 because it groups together the "open" and "moderately closed" VSS 5 ("A or B") and VSS 6 ("A or B") (McCusker 2013: 27 – Table 6), making it impossible to distinguish open stands with "40-70% interspace" from moderately closed stands with only "25-40% interspace." Clearly, many of the open ("A") VSS 5 and 6 stands do not meet forest plan criteria for old growth, which require a minimum of 50 percent canopy cover. For the sake of argument, even if all of the VSS 5 ("A or B" and "C") and VSS 6 ("A or B" and "C") were to be counted as old growth, that would amount to just 15,363 acres, or about 10 percent (10.54%) of ponderosa pine forest in RU1. Therefore, the Forest Service includes

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disturbance. Old growth components include old trees, snags, coarse woody debris, and structural diversity (Kaibab NF forest plan page 18). The FEIS reflects the new plan direction. The vegetation analysis in the FEIS (chapter 3) describes how the alternatives move towards desired conditions. The implementation plan (appendix D in both the DEIS and FEIS) describes in detail how treatments would be designed to protect old trees. The old growth discussions and analysis can be found in the FEIS on pages 15-18, 156-157, 174-176. Also see the silviculture report. (180-38) The DEIS discloses that most sites do not currently meet (forest plan) old growth definitions (DEIS page 15). The allocation direction in the forest plan directs the project to "strive to create or sustain as much old growth compositional, structural, and functional flow as possible over time at multiple-area scales…and seek to develop or retain old-growth function on at least 20 percent of the naturally forested area by forest type in any landscape" (USDA 1987, USDA 1988), see page 15 of the DEIS." The DEIS (page 15) describes the areas included in the old growth allocation. What is included in the ponderosa pine allocation goes beyond old and mature VSS classifications. As noted above in a previous response, we included areas closest to meeting old growth conditions. The Silviculture Specialist Report (page 46) states that the areas allocated "are managed to move toward those conditions to meet structural attributes over time". Since the DEIS was published, the Kaibab NF revised its forest plan (USDA FS 2014). Desired conditions (paraphrased) at the fine scale include having tree groups of various age classes and size classes, having crowns of trees within the mid-aged to old groups (Kaibab NF forest plan, p. 17). The (paraphrased) desired condition at the landscape scale (over 10,000 acres) is to have old growth occur throughout the landscape as a component of uneven-aged management with the location of old growth shifting on the landscape as a result of succession and disturbance. Old growth components include old trees, snags, coarse woody debris, and structural diversity (Kaibab NF forest plan page 18). The FEIS reflects the new plan direction. The vegetation analysis in the FEIS (chapter 3) describes how the alternatives move towards desired conditions. The implementation plan (appendix D in both the DEIS and FEIS) describes in detail how treatments would be designed to protect old trees. The silviculture report clarifies that the Kaibab Forest plan

	in its presentation of “ponderosa pine old growth acres” for RU1 a minimum of 49,826 acres of forest that are not old growth by any definition, and in doing so, it grossly exaggerates the extent of old growth in the unit. DEIS at 79 (Table 22); also see Fletcher and others (2012: 689-94) (Table 190 displays existing forest structure in goshawk habitat); id. 697 (Figure 140 shows that VSS 5/6 comprises 8% of goshawk habitat in RU1). The discrepancy of actual old growth, which is rare, from the Forest Service’s grossly inflated “allocation” of old growth is the result, in part, of its inclusion of non-old growth in the “allocation”: The old growth allocation acreage/percentage for ponderosa pine includes 100 percent of MSO protected habitat, 100 percent of MSO target/threshold habitat, 40 percent of MSO restricted habitat that is uneven-aged with low dwarf mistletoe infection, and 80 percent of MSO restricted habitat that is even-aged and mid-aged to old with low dwarf mistletoe infection. In goshawk habitat, the old growth allocation acreage/percentage for ponderosa pine includes 100 percent of goshawk nest stands, 40 percent of goshawk PFA and foraging areas that are uneven-aged with low dwarf mistletoe	does not specify a percentage of required old growth habitats. However, to be consistent across forest boundaries the old growth on the Kaibab NF will be analyzed against the 20% allocated habitat (FEIS Silviculture Report, page 68).
Lininger, Jay	infection, and 80 percent of goshawk PFA and foraging areas that are even-aged and mid-aged to old with low dwarf mistletoe infection.	(180-39) Please see our previous responses.
	DEIS at 15 (emph. added); also see McCusker (2013: 5-6) (defining “mid-aged” as VSS 4). It is not clear from the analysis if the Forest Service surveyed any of the mid-aged stands it allocated to old growth and verified that they are, in fact, “close” to meeting old growth criteria. Nor is it clear if the agency simply deducted 20 percent of the MSO and goshawk habitats described above and arbitrarily grouped them into the old growth allocation. Either way, the public must receive the underlying environmental data from	(180-40) Please see all previous responses for old growth. The Coconino NF forest plan states that allocations will consist of landscape percentages meeting old growth conditions and not specific areas. Areas (by percent) identified in the DEIS (page 15) would qualify as de-facto areas within stands that were not counted as part of the percentage. These areas cannot be mapped but would be managed towards old growth conditions. The vegetative data for each stand is available in the project record. The selected allocated old growth areas are to be managed towards achieving the forest plan old growth criteria over time. These areas were selected based upon their existing condition and site potential to best meet the old growth criteria in the shortest time frame.Forest plan requires that 20% of each foresttype be managed towards the described old growth conditions. Areas were identified in the project to do just that.
Lininger, Jay	which Forest Service experts derive their conclusions. See Idaho Sporting Congress v. Thomas, 137 F.3d 1146, 1150 (9th Cir. 1998).	
Lininger, Jay	In sum, the DEIS hides the ball and precludes the public from making an independent determination that the project meets forest plan	(180-41) We disagree and thank you for your comment.

Lininger, Jay	standards and guidelines for old growth at each of the prescribed spatial scales. It does this in four ways: (1) It fails to analyze old growth at all of the required spatial scales. One cannot tell, for example, how much old growth exists scaled below each restoration subunit. (2) “Most” of the ponderosa pine forest “allocated” to old growth does not meet forest plan standards, and the DEIS fails to disclose the actual extent of old growth. (3) It fails to disclose the method by which the agency determined that “allocated” stands are “closest” or “best meet” forest plan standards for old growth, or supply any qualitative analysis of how they diverge from plan standards. (4) It fails to disclose effects of treatments under the action alternatives (i.e., reduction) to the distribution and extent of existing old growth. At no point does the DEIS discuss the condition of existing old growth habitat or effects of the action alternatives this rare and important habitat. See DEIS at 79-80 (Tables 22 and 23 and Figure 30 display “old growth allocations,” not actual old growth); 61 (modification to the collaborative large tree retention strategy for the purpose of creating “regeneration openings” by removing large trees); 644 (alluding to unspecified “exceptions” for old tree removal). NEPA requires a hard look at impacts to old growth habitat. See 40 C.F.R. § 1502.1 (the EIS “shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment”); 1502.2(d) (“Environmental impact statements shall state how alternatives considered in it and decisions based on it will or will not achieve the requirements of [NEPA] and other environmental laws and policies”); 1502.16 (“The discussion will include the environmental impacts of the alternatives including the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented”). On this point, the 4FRI stakeholders collectively commented to the Forest Service on this	The effects to old growth are displayed in the DEIS at the following locations: p 98, 138, 140 (also discussed in depth in the silviculture specialist report which is included by reference to the DEIS on page 121), 202 and 245. The DEIS clearly identifies loss of old growth as an irretrievable commitment of resources on p 331. The statement about a the tripling of road miles is curious---the project is not proposing any new road construction and the DEIS proposes decommissioning of 904 miles of roads (DEIS , p 41).The FEIS does add a design feature for temporary road construction that states to avoid old and large trees in temporary road construction .

DEIS, “What is unknown is to what degree there will be ‘safety and human health’ or ‘habitat degradation issue’ situations as part of project implementation (new road construction, landings and skid trails), and to what extent project activities might affect old tree mortality (prescribe burning mostly, and some harvest activity).” More, “It is difficult to tell from information provided in the DEIS, what level of impact the almost tripling of road miles might have on the preservation of old trees.”

Old growth removal, as allowed by all of the action alternatives, will violate forest plan guidelines requiring the Forest Service to “[D]evelop or retain old-growth function on at least 20 percent of the naturally forested area by forest type in any landscape.” Coconino Forest Plan at 70-1; Kaibab Forest Plan at 32 (emph. added). As explained above, old growth is not likely to exceed 10 percent of the project area in its current condition. Because the agency is so far from meeting the mandatory standards and guidelines for old growth habitat, it cannot remove any additional old growth trees, or large trees that may contribute to old growth in the future, until it demonstrates compliance with the forest plans. See Neighbors of Cuddy Mountain v. U.S. Forest Serv., 137 F.3d 1372, 1377 (9th Cir. 1998) (to comply with old growth standard in a forest plan, agency must show that minimum requirements would be met within affected areas after timber sale); Lands Council v. Vaught, 198 F.Supp.2d 1211, 1224 (E.D. Wash. 2002) (“Plaintiffs claim that even if the Project does not log old growth, compliance with the [Forest Plan’s] old growth standards must be demonstrated to ensure that the mature trees logged under the Project are not needed to fill any shortfall in the required old growth acreage …”) (emph. added); also see USDA (2007b: 8) (Forest Service cannot “thin” large trees in an attempt to “promote faster growth” unless it is in compliance with the 20% old growth requirement).

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(180-43) Please see our previous responses on the conservation of old trees, large trees and old growth. The project is not proposing to remove old trees. The DEIS explicitly states the desired condition for old growth is to allocate sites that are closest to old growth characteristics for old growth and manage to attain old growth characteristics on these sites(DEIS, pages 16-17). The DEIS also clearly states that old growth trees will be retained (Appendix D, Section C, pages 644-45). The following is a list of project designs that safeguard against “old growth removal”. The Old Tree Implementation Plan (DEIS Appendix D – Section C, Pgs. 644 and 645) ensures that old trees will be retained within the OG allocated areas and throughout the entire project area. Design specific to old trees (DEIS Appendix D, Section A): Pg. 610 - Manage for the sustainability of individual/isolated old ponderosa pine trees as defined in the Old Tree Implementation Strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to the treatment diameter limit that do not meet the old tree definition and whose crowns are outside the old tree crown drip line 1) within a 50-foot radius that are in the intermediate or suppressed crown positions and 2) that would eliminate direct crown competition on two of the four sides of the old tree. Pgs. 613 and 614 - Manage for the sustainability of individual/isolated old ponderosa pine trees as defined in the Old Tree Implementation Strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to 18-inch dbh that do not meet the old tree definition and whose crowns are outside the old tree crown drip line 1) within a 50-foot radius that are in the intermediate or suppressed crown positions and 2) that would eliminate direct crown competition on two of the four sides of the old tree. Pg. 616 - Manage for the sustainability of

individual/isolated old ponderosa pine trees as defined in the Old Tree Implementation Strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to 18 inches dbh that do not meet the old tree definition: 1) within a 50-foot radius that are in the intermediate or suppressed crown positions and 2) that would eliminate direct crown competition on two of the four sides of the old tree. Pgs. 618,621, 623, 625, 627, 629, 631, 634,636, and 640 - Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the Old Tree Implementation Strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention. Pgs. 619, 621, 624, 629, 632, and 634 - Manage for the sustainability of individual/isolated old ponderosa pine trees as defined in the Old Tree Implementation Strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to 18 inches dbh that do not meet the old tree definition: 1) within a 50-foot radius that are in the intermediate or suppressed crown positions and 2) that would eliminate direct crown competition on two of the four sides of the old tree. Pg. 627 - Tree group arrangement, size, and density are a function of existing pre-settlement trees and evidence. Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range. Pg. 639 - Where ponderosa pine is present, retain all pre-settlement yellow pines and one to two replacement blackjacks per existing yellow pine or pre-settlement evidence (i.e., to approximate the naturally-occurring stand composition). Replacement blackjacks should be comprised of a variety of size classes. Blackjacks would be retained within 100 feet of the yellow pine or pre-settlement evidence they are replacing. Pg. 641 - Tree group arrangement, size, and density are a function of existing pre-settlement trees and evidence. Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees

adjacent to pre-settlement tree evidences at a 1:1 ratio. Ponderosa pine, pinyon, and juniper not meeting long-lived characteristics may be removed.

Moreover, because old growth is deficient in the project area, the Forest Service is hard pressed to demonstrate that removing more will maintain the viability of old growth dependent species, as required by NFMA. The agency cannot simply assert without supporting scientific analysis or data that logging additional large and old trees, as proposed in this project, will somehow improve the remaining habitat for old growth dependent species. See Ecology Center v. Austin, 430 F.3d 1057, 1064-65 (9th Cir. 2005) ("The agency cannot simply treat its prediction that logging these large trees will benefit old growth dependent species as a fact instead of an untested and debated hypothesis"). It must disclose scientific uncertainty regarding its assumption that proposed logging of large and old trees will meet the purpose and need to restore the ecological condition of ponderosa pine forest and the improve old growth habitat and dependent species that remain (e.g., Allen et al. 2002, Brown et al. 2004, DellaSala et al. 2004).

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(180-44) Please see all previous responses to old growth and the topic of old growth and wildlife. The effects on old growth-dependent species are disclosed within the wildlife section of the DEIS (pages 173-245) and the corresponding wildlife specialist report that is included by reference.

(180-45) Openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, "Interspace would occupy approximately 25 to 40percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet". Table 118 on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. In terms of effects to wildlife, group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for

At the landscape scale, proposed treatments will result in a significantly more open forest condition, with both short and long term impacts to forest canopy and canopy dependent species, than assumed in prior environmental analysis underlying the forest plans (USDA 1995, 2006). "Post-treatment openness" is a significant issue for analysis, and it is one evaluation indicator for measuring canopy cover in northern goshawk habitat. See DEIS at 124; also see McCusker (2013: 8) ("canopy density and openness" considered together). The Forest Service has not adequately explained how using a silvicultural tool designed to project forest structure at the stand level can be accurately applied to model structure at smaller group scales (i.e., <1 acre). It also has not explained how restricting the retention of closed canopy forest structure to small tree groups will avoid negatively impacting canopy dependent species.

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remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. Additional analysis has been added to the FEIS. A summary in chapter 2 on the environmental consequences for MSO habitat states, “In MSO nesting and roosting habitat, there would be no change between alternatives A-E in percent of openness. The percent openness (degree of heterogeneity) would remain the same as the existing condition. This is because thinning treatments would limit the removal of the overstory structure. In alternative A in MSO restricted (all) habitat, the percent of openness would remain the same as in the existing condition. Existing interspace would continue to be encroached upon by expanding tree crowns and ingrowth. In alternatives B-E there

would be little change in the very open to open categories". Post treatment landscape openness in goshawk habitat was presented as issue 3 in the DEIS. In the DEIS, the analysis of goshawk habitat components is located on pages 126 to 133 of the DEIS. In response to comments on the DEIS and to address changes since the DEIS was published, the goshawk analysis was revised and additional analysis has been added to the FEIS. In the FEIS, additional analysis conclusions have been included for heterogeneity. For example, in the summary comparison of alternatives table (FEIS chapter 2), a heterogeneity category has been included. Metrics including percent openness or interspace (at landscape and habitat type sub-scale) and spatial arrangement have been used to describe the post-treatment condition. Also see the silviculture report. The effects on canopy dependent species are disclosed within the wildlife section of the DEIS (pages 173-245) and the corresponding wildlife specialist report that is included by reference. Project design features include landscape-scaled, closed-canopy connectivity corridors developed by the AGFD and jointly integrated into the 4FRI treatment planning process. These corridors will provide closed-canopy conditions for individual animals while providing movement corridors across the entire treatment area, thereby benefiting overall populations as well. See appendix 3 of the wildlife specialist's report for more details on habitat for canopy-dependent species. In addition, the 4FRI silviculturist adjusted treatments to support research on the impacts of proposed treatments on canopy-dependent birds and tree squirrels. This 4FRI supported, AGFD research will specifically evaluate effects of closed canopy patch size on a range of canopy-dependent species. In addition to creating design features that provide closed canopy conditions at large scales, site-specific mitigation would add to the habitat heterogeneity at local, site-specific scales. Mitigation that prohibits mechanical treatments around bald eagle nest and roost sites, osprey nests, accipiter and other raptor nests, heron rookeries, turkey roosts, cave entrances and sink holes, and design features that vary within-stand tree densities and size-class variability will add further refugia for wildlife associated with closed canopy condition. Finally, when spending time on the ground hiking, evaluating, investigating, and reconnoitering areas, it is clear that in addition to all the site-specific designations, there are also

		persistent but unquantifiable areas within stands proposed for more open treatments that will remain in closed canopy conditions. These include site conditions too steep or too rocky for treatment. These areas as well as the many small scale but steep canyons and draws cutting across the landscape represent additional areas that will retain canopy conditions. Overall, based on the forest restoration research done within this same landscape, and by overlaying soil maps with wildlife habitats, the post-4FRI landscape will include much more closed-canopy habitat than what occurred historically. However, negative impacts could occur to canopy dependent species if the only measure is a comparison to existing conditions. Today's forest support artificially inflated amounts of closed canopy habitat resulting from the last century of anthropocentric influences (see the wildlife, silviculture, and fire ecology reports). The whole point of the 4FRI is to move away from the extensive, dense forests with continuous canopies. By moving the landscape towards presettlement conditions, we expect some wildlife species will decrease in abundance compared to today's levels. However, given the large and small-scale planning that included designing and mitigating for closed conditions, along with the independent datasets indicating the post-treatment landscape would be denser than presettlement conditions, it is reasonable to assume that canopy-dependent species would be maintained at levels below current populations, but above presettlement conditions. If research concludes differently, treatments can be adjusted.
Lininger, Jay	The proposal to create "interspaces" within ponderosa pine forest and count them separately from Vegetative Structural Stage ("VSS") 1 (grass/forb/shrub) will result in significantly less closed-canopy ponderosa pine forest than needed to support viable populations of sensitive species, including northern goshawk and its prey (AGFD 2007).[7][7] Design features common to all action alternatives that relate to the adjacency of interspaces and regeneration openings are likely to result in the reduction in area of closed canopy tree groups in the higher intensity treatment types to far less than one acre.	(180-46) Please see our previous response on post-treatment openness.
Lininger, Jay	On May 18, 2012, the Forest Service awarded a contract to Pioneer Forest Products for implementation of "Phase 1" 4FRI treatments on 300,000 acres in four national forests.[2][2] Contracting documents provide evidence of the "comprehensive" nature of the 4FRI effort	(180-47) Please see our previous response.

	reaching beyond the scope of actions and environmental impacts considered in the DEIS now at comment, which considers only a portion of the 4FRI program in an area of less than one million acres on two national forests. They raise questions about inappropriate segmentation of NEPA analysis.[3][3] In a similar case, the Forest Service violated NEPA by breaking down its overall post-fire management strategy for the Umatilla National Forest into smaller individual projects: Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1215 (9th Cir. 1998). As in that case, 4FRI contracting documents clearly demonstrate that the 4FRI is a "comprehensive" proposal that includes foreseeable actions and impacts that are outside the scope of this DEIS. Indeed, the contract itself contradicts the stated position of the Forest Service that it has "insufficient information for analysis" of potentially significant cumulative effects of 4FRI activities in the other two national forests. DEIS at 697 ("The Four-Forest Restoration Initiative, Apache-Sitgreaves NFs and Tonto NF, has no tangible information that would be meaningful for this cumulative effects analysis."). The reason given for failing to consider and disclose cumulative effects is contrary to available facts and it is	
Lininger, Jay	unreasonable. Agencies are required to ensure professional integrity of NEPA analysis. See 40 C.F.R. § 1502.24.	See response to comment 180-10.
Lininger, Jay	Thinning percentages for mid-aged (VSS 4) and mature (VSS 5) forest, as expressed by stocking densities and residual canopy cover, have the potential to result in a significantly more open landscape than the DEIS indicates. See DEIS at 710 (Table 161). The Forest Service needs to clearly state how these percentages were derived and which goals each percentage is designed to achieve. Table 161 appears to apply desired within-group densities to all VSS 4, 5 and 6 (old forest) proposed for treatment, as these structural stages are listed under the "Species/Resource" column of that table. The agency proposes to thin approximately 50% of the mid-aged (VSS 4) groups to the lower range of desired stocking conditions. Higher percentages of interspaces and regeneration openings in proposed treatments already result in overall basal areas on the very low end of the stated desired conditions. It is unclear what impact the proposed "within group density" percentages in Table 161 will have	(180-49) Table 161 lists specific design features that would contribute to bridge habitat. The design CBD is referring to is documented in the DEIS Appendix D, pgs. 619 and 629. The full design states that the intent of the design is to "manage mid-aged, mature and old tree groups for a range of density and structural characteristics". This design provides direction to the implementation staff to find opportunities to manage tree group stocking for a variety of tree densities and not just the minimum needed to meet the canopy cover requisite. Tables 119 (pg. 619) and 129 (pg.630) list stocking guidance at the low, middle and upper density levels appropriate to meet this design. Table 140 illustrates the relationship of treatment intensity (% of interspace and % of tree occupancy), and overall average density under different treatment scenarios. The objective of this table is to emphasize that interspace, regeneration openings, tree group density and overall density need to be considered together as opposed to individual

	on overall forest structure. See id. 654 (Table 140).	
Lininger, Jay	Bridge habitat We support the intention of the 4FRI project to provide “bridge habitat” for canopy dependent wildlife to span the time between restoration treatments and development of a more uneven-aged forest structure. As the discussion in DEIS Appendix G notes, the current closed canopy conditions are largely the result of smaller diameter trees, and it will take time for a mature forest structure to emerge. However, we question the assumptions and conclusions made in Appendix G in regards to the provision of adequate bridge habitat to maintain viable populations of canopy dependent species. The “conclusions” section of Appendix G relies on four assumptions: · 42 percent of treated ponderosa pine forest would remain in “moderately closed” to “closed” condition. · Old growth allocations accounting for 38 percent of the ponderosa pine treatment area would be well-distributed across the landscape. · A patch mosaic of small deferrals (“skips” and “gaps”) would provide key habitat features across the project area. · Implementation guidance in MSO and northern goshawk habitats provides higher density canopy cover relative to the surrounding landscape. See DEIS at 713. Regarding the first assumption above, the analysis only relates to posttreatment density based on the percent of area left at various interspace levels. See id. 701 (Tables 158, 159). It does not include proposed regeneration openings, which will have a short-to-mid term impact on overall “openness” of forest structure. Regeneration openings range from 10-to-20 percent of tree groups. Table 140, on page 654 of the DEIS, best illustrates the relationship between potential openings and canopy in tree groups, as well as residual basal area. Looking at actual proposed treatment densities in Table 140 illustrates the potential impact of regeneration openings on the assumptions used to declare that the moderately closed category provides for adequate bridge habitat. Lower treatment intensities in the 10-to-25 percent range are more open than the analysis in Appendix G suggests. In that treatment intensity, with 20 percent of treated areas in interspaces, just 80 percent of them	entities in order to achieve the desired conditions. Figure 74 (pg. 657) further discloses the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. Also see our previous response on post-treatment openness (180-47). (180-50) Not all treatments in this category would implement regeneration openings. For example, LOPFA/PFA IT and SI 10-25s and 25-40s, MSO Target/Threshold, MSO PAC Mechanical as well as Rx fire only treatments would not create regeneration openings. The objective of table 140 is to emphasize that interspace, regeneration openings, tree group density and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS pg. 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width and the amount of regeneration openings may be made during implementation to ensure tree group density remains outside of the “red zone” density (DEIS page. 657). The bridge habitat discussion lists old growth allocation under the heading Bridge Habitat at the RU Scale (Pg. 705). Under this heading, it states that areas allocated to old growth will contribute to bridge habitat. On page 707, it goes on to explain how the old growth allocations do contribute to bridge habitat. While not acres meet the old growth definition, these acres were selected for old growth allocation because they best meet those conditions and would be managed so that existing old growth would be retained and future old growth would be developed. We can only work with the forests that currently exist on the landscape. Old-growth is allocated to meet and maintain certain forest structural conditions defined in part by tree age. Bridge habitat refers to closed canopy conditions that support a host of species ranging from mule deer and black bears to song birds (DEIS page 699). Closed canopy and old growth are not synonymous. Closed canopy refers to those forested areas in dbh size classes 4, 5, and 6 with canopies that are closed. The phrase closed conditions is defined on page 699. On page 700 of the DEIS, the bridge habitat discussion discloses the assumptions used to ascertain the 8 percent figure for other projects as well as the 8 percent figure for “wilderness areas slopes >40 percent and MSO PACs not

would consist of tree groups, with potentially 20 percent of the tree groups as “regeneration openings.” The result would be 40 percent of the current forest in created openings, which is double the proportion displayed in the “openness” category. To use an example from the moderate density category (Table 140, page 654 of the DEIS): An area with 30 percent interspace, 70 percent tree groups, and 20 percent of the tree groups replaced with regeneration openings would result in 50 percent of the total area in created openings (see Table 2 below). As the percentage of tree groups shrinks in relationship to openings, the tree group basal area also rises to achieve basal area retention of 50-to-70 ft²/acre, as stated in the treatment designs. This could have an impact on achieving objectives related to fire and large tree retention. The first assumption above is not supported by analysis in the DEIS and associated specialist reports. The second assumption above only refers to old growth allocations, not existing old growth forest. The old growth discussion in DEIS Appendix G references forest plan requirements for old growth and states that the allocated acres “most closely resemble old growth, but do not currently meet all the forest plan parameters of old growth.” Without information regarding how many of the old growth allocated acres actually meet forest plan criteria at each of the prescribed spatial scales, and their location, this assumption is premature. Furthermore, the conclusions drawn in the DEIS regarding the achievement of old growth requirements are often in conflict with data displayed in various specialist reports, as discussed above. It is important to know how many of the allocated old growth acres currently are VSS 5 (mature forest >18-inches dbh) and VSS 6 (old forest >24-inches dbh). Appendix G relies on the assumption that all of the allocated old growth acreages overlapping Mexican spotted owl and northern goshawk habitat will meet the needs of canopy dependent species following treatments. The allocation includes: · All Mexican spotted owl protected habitat. All Mexican spotted owl “target/threshold” habitat. · · Forty percent (40%) of Mexican spotted owl restricted habitat that is uneven-aged with “low” dwarf mistletoe infection. · Eighty percent (80%) of Mexican spotted owl restricted habitat that is even-aged, mid-aged (VSS 4) to old (VSS 6), with “low” dwarf

identified for mechanical treatment” and what the limitations of those assumptions may be. In summary, the effects on canopy dependent species are disclosed within the wildlife section of the DEIS (pages 173-245) and the corresponding wildlife specialist report that is included by reference. D ue to response to comments and work to clarify comments surrounding canopy openness with your organization, Grand Canyon Trust, the Eastern Counties Organization and Navajo and Gila Counties, there is specific guidance related to canopy cover on areas with a preponderance of large, young trees within alternative C and E in the FEIS in northern goshawk habitat outside of wildland urban interface areas.

mistletoe infection. · All northern goshawk nest stands. · Forty percent (40%) of goshawk post-fledging areas ("PFA") and foraging areas ("LOPFA") that is uneven-aged with "low" dwarf mistletoe infection. · Eighty percent (80%) of goshawk PFA and foraging areas that are even-aged, midaged (VSS 4) to old (VSS 6), with "low" dwarf mistletoe infection. Following this explanation is Table 20 in the Silviculture Specialist Report (McCusker 2013: 45), which presents "allocated" old growth acres and percent by restoration unit and subunit. What should follow is a single table illustrating the percentages of bridge habitat available in the old growth allocations. Instead, a reader must compare a dozen or more separate tables just to estimate the bridge habitat quality and quantity represented in Table 20. Having done this, it appears to us that the ponderosa pine old growth acres in Table 20 merely represent the total acreages of Mexican spotted owl and northern goshawk habitat types listed above. In other words, the designation of "bridge habitat" appears to result from an arbitrary desktop mapping exercise rather than from any site-specific assessment and field verification of the availability of such habitat within those digital polygons. Furthermore, Tables 16, 17, 18 and 19 in the Silviculture Specialist Report (McCusker 2013: 41-44) describe the structural stage percentages for northern goshawk habitat from which the old growth allocations are drawn. Totaling the percentages for VSS 5 (mature) and VSS 6 (old) in those tables and combining that data with other tables leads the reader to estimate potential acreages for old growth in goshawk habitat. However, the actual extent of old growth habitat, especially in all even-aged categories and in uneven-aged LOPFA, is significantly below the minimum criteria for old growth established in the forest plans. Therefore, the assumption that old growth "allocations" will meet the habitat needs of canopy dependent species is not supported by the project analysis. Third, even if the assumption that "small deferrals" would provide habitat is correct, it does not meet the habitat needs of canopy dependent wildlife for two reasons: (1) the Forest Service admits that it does not know how much of those deferrals are currently in a "closed" or "moderately closed" condition; and (2) it fails to consider cumulative effects of other projects. It clearly does not consider the Flagstaff Watershed

	Protection Project, and no specific information about ongoing or foreseeable actions in the project area is provided. Finally, the forest plan amendments will significantly change measurement of canopy cover, as discussed below. It is not valid to assume, in light of those plan amendments, that retaining canopy cover at the small tree group scale (<1 acre) will maintain adequate forest cover to support viable populations of sensitive and threatened species. Clearly, habitat of Mexican spotted owl will have a higher average post-treatment basal area and canopy cover than other settings in the project area. However, many of the same design features and treatment intensity levels apply throughout other habitat settings, which could result in a very similar degree of openness across the project area. New goshawk guidelines (USDA 2007b), which are incorporated into all of the action alternatives by the forest plan amendments, will not result in a higher density of canopy relative to the surrounding landscape (AGFD 2007). Even if canopy densities vary within tree groups, the new guidelines contained in the plan amendments are likely to result in a uniform level of openness at a project scale. Northern goshawk	
Lininger, Jay	All of the action alternatives in the DEIS include amendments to standards and guidelines of the Coconino and Kaibab Forest Plans, as amended (USDA 1996), for management of sensitive northern goshawk in ponderosa pine forest. Alternative C (preferred) would require plan amendments that: (1) “add the desired percentage of interspace within uneven-aged stands” (excluding goshawk nest areas); (2) “add the interspace distance between tree groups”; (3) “add language clarifying where canopy cover is and is not measured”; (4) allow between 27,675 acres (Kaibab) and 29,017 acres (Coconino) to be managed “for an open reference condition”; and (5) define in the plan glossaries the terms “interspaces,” “open reference condition,” and “stands.” DEIS at 82; also see id. 440 (Table 91); 499 (description); 520-27 (Alternative C). The Center and the Arizona Game and Fish Department share concerns regarding the Forest Service’s emergent interpretation of standards and guidelines for management of northern goshawk habitat in ponderosa pine forest. In particular, the state agency commented to the Forest Service that changing the spatial scale at which canopy cover is	(180-51) Thank you for your comment. However, as you know, the Arizona Game and Fish Department (a cooperating agency for this project) has refuted your statements regarding their position and concerns for this project (see project record documentation from Arizona Game and Fish Department). The Arizona Game and Fish Department expressed concerns in 2007 regarding the Jack Smith-Schultz Project. They have been supporters of the restoration strategy, the desired conditions described for the 4FRI Project, and co-authored the bridge habitat section (Appendix G). The Arizona Game and Fish Department did not provide comments related to canopy closure in their comment letter for the DEIS. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a “read the land” approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree

measured to the tree group level, as proposed in this DEIS, “has the potential to significantly reduce the amount of forest cover within treated areas.”[8][8] Table 2 below demonstrates the difference between stand- and group-level canopy cover that mayresult from implementation of different interpretations of relevant forest plan guidelines. It describes forest treatments in a way consistent with the proposed action, listing the amount of forested (tree groups) and non-forested (openings or “interspace”) that may result.[9][9] This schematic demonstrates that the proposed action may fall short of canopy cover requirements set forth in the Coconino Forest Plan and may significantly impact sensitive wildlife species dependent on closed canopy forest habitat at a level of intensity that exceeds what was analyzed and disclosed prior environmental analysis (USDA 1995, 2006). In addition to shifting interpretation of Forest Plan guidelines for canopy cover in northern goshawk habitat, the Forest Service also appears to change its accounting of forest openings set forth in the Vegetation Structural Stage (“VSS”) classifications of the forest plans. According to the new interpretation (USDA 2007b), “interspaces” located in between small tree groups (<1 acre) are not to be included in VSS 1,[10][10] which may result in significantly more openings than anticipated in prior environmental analysis (USDA 1995, 2006). As much as we can, we are adapting current prescriptions to take into account interspaces between groups and we have adjusted these prescriptions to consider group size and how we look at groups […] The original analysis and documentation generally looked at how we interpreted the goshawk guidelines in the forest plan in a different manner as are currently looking at them […] This will lead to a much more open forest over time than previous interpretations of the goshawk recommendations in the forest plans would have. [11][11] The new goshawk guidelines are significant new information requiring NEPA analysis because their implementation may significantly impact the environment in a different manner than expected by past impact statements underlying the current forest plans (USDA 1995, 2006). In the final EIS supporting the 1996 Plan Amendments, including the existing goshawk guidelines, the Forest Service clearly intended to provide wildlife habitat associated with herbaceous and shrub-dominated evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the “red zone” density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be

vegetation communities within the VSS classification system: Some species totally depend on one or more of these cover types and respective vegetation structural stages (VSS), while others are casual uses. Regardless of the degree of use, it is important to maintain a diversity of cover types and vegetation structural stages across landscapes to sustain healthy wildlife populations and communities. This programmatic analysis of the alternatives is primarily based on three broad habitat characteristics that can be evaluated at the programmatic EIS level. These three wildlife habitat characteristics are cover type, vegetation structural stages (VSS), and forage production. Cover type and VSS represent the overstory characteristics of the habitat and forage production represents the understory. The structural stages are grouped by early, mid and late stages (VSS 1&2, VSS 3&4, and VSS 5&6, respectively). USDA (1995: 28-29). The Forest Service previously assumed that VSS 1 and 2 would be sufficient to provide for wildlife species that require "forage production" as a critical element of habitat. Id. 30 ("The alternatives that would produce the most forage, in decreasing order, are E, A, F, C, D and G. Since understory habitat is important for many of the non-TES wildlife species and [sic] there is a need to increase understory habitats"). The 4FRI stakeholders commented to the Forest Service on this DEIS, "It is [] unclear in the document at what scale the USFS will be balancing the distribution of structural stages, as they relate to regeneration openings, interspaces and tree groups. We know from the DEIS that percentages have been assigned at small spatial scale. What is unclear is how these will be distributed across the mid-scale (100 to 1,000 acres)." They recommend adding assurances in the analysis and decision that clearly state old trees will not be cut to create regeneration openings. Further, the stakeholders suggest including visually graphic examples of regeneration openings applied at the fine (<100 acres), mid-scale (100-1,000 acres) and restoration unit scale. We echo their comments here because the forest plans require analysis of goshawk habitat at multiple scales.

accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. Also see our previous responses on post-treatment landscape openness.

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The Forest Service asserts that the plan amendments affecting northern goshawk are "a specific, one-time variance" for the 4FRI project that would "not apply to any other forest project." DEIS at

(180-52) We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing

	520 (Coconino NF – Alternative C); 536 (Kaibab NF – Alt. C). However, that characterization of the amendments is misleading to public understanding because the agency is simultaneously advancing similar or identical amendments to the Coconino Forest Plan in concurrent projects including: · The Clints Well Decision Notice changed management direction affecting 7,695 acres of goshawk habitat in the Coconino National Forest.[12][12] · The Wing Mountain Decision Notice changed management direction affecting 8,922 acres of goshawk habitat in the Coconino National Forest.[13][13] · The Rim Lakes Final Environmental Impact Statement proposes new plan direction affecting 16,835 acres of goshawk habitat in a 4FRI "Phase 1" contracted action the Apache-Sitgreaves National Forest.[14][14] · The Mahan-Landmark proposed action would amend plan direction affecting about 25,000 acres of goshawk habitat in the Coconino National Forest.[15][15] · The Flagstaff Watershed Protection Project proposed action would change plan standards and guidelines on 3,130 acres in the Coconino National Forest.[16][16] The Forest Service is required by NFMA and NEPA to take a hard look at the overall cumulative effect of these numerous plan amendments on the viability of sensitive species and their prey.	Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). The DEIS (pages 201-216) and the wildlife specialist report (pages 358-405) have taken a hard look at the effects of the plan amendments for projects that fall within the cumulative effects analysis areas for sensitive species except for the goshawk. The FEIS has included this into the cumulative effects section for goshawk in both the wildlife specialist report and in the FEIS . In the FEIS, the cumulative effect section for the goshawk still supports the conclusion that the plan amendments for the 4FRIproject are still non-significant plan amendments.
Lininger, Jay	Furthermore, standards and guidelines of the Coconino Forest Plan for northern goshawk are scientifically controversial as a means of ensuring population viability. Beier and others (2008) studied influences of ponderosa pine forest structure on northern goshawk reproduction and concluded that the Forest Service should reconsider its decision to apply the guidelines to most of the forested lands in the Southwestern Region. "Production of fledglings decreased as the breeding area's similarity to the goshawk guidelines increased" (Beier et al. 2008:347). The Coconino Forest Biologist wrote that the study "sort of rocks the world for the 1996 goshawk guidelines."[17][17] Beier and Ingraldi (2012) discussed implications of those findings regarding Forest Plan implementation and goshawk viability.	(180-53) A discussion of the Beier et al. 2008 and Beier and Ingraldi 2012 can be found on pages 114-116 of the wildlife report. It should be noted Beier et al. (2008) is based on a review of the General Technical Report RM-217 - Management Recommendations for the Northern Goshawk in the Southwestern United States (Reynolds et al. 1992). While the technical report was used as part of the 1996 Regional Amendment to all Region 3 Land Management Plans, the technical report and the goshawk standards and guidelines within the amended plans are not exactly the same. The selected alternative standards and guidelines for the northern goshawk were developed in early May 1995, and considered all known information from the Goshawk Interagency Implementation Team recommendations, the joint Arizona and New Mexico game agencies letter that responded to the DEIS, and experience gained during the implementation of the interim direction (USDA 2006). During the design process for projects (developing alternatives), the forest follows the Forest Plan unless a plan

		amendment is analysis. Reynolds et al. (2012) found Beieret al. (2008) had miscalculated vegetation structural similarities and introduced a systematic bias into their test by inadequately sampling breeding areas for reproduction. Reynolds et al. (2012) also noted they felt that the authors misunderstood the desired forest structures described in the technical report. Evidence of their misunderstandings included: 1) no discussion or use of methods suited for detecting tree aggregations, 2) their method for estimating canopy cover, and 3) their statement that the structures in the technical report differ markedly from presettlement forest structures when in fact the two structures are similar. Beier and Ingradli (2012) acknowledged that sampling across a broader spectrum of similarity would provide a much stronger evaluation of the technical report. They also noted the following "we carefully avoided inferring that the recommendations were "bad for goshawk". Instead we cautiously pointed out that our results provided no evidence that the recommendations improve goshawk nest productivity." The goshawk recommendations in Reynolds et al. (1992) were developed "to conserve the goshawk in the southwestern United States" along with 14 key prey species. They do not state that it would improve nest productivity. The 1996 Plan amendment "provides for integrated multiple use and sustained yield of goods and services from the Forest in a way that maximizes net public benefits in an environmentally sound manner". Reynolds et al. (2012) noted that ecosystem-based forest management requires long planning horizons to incorporate forest dynamics to take in changes resulting from vegetation growth and succession and periodic resetting of trees by natural and anthropogenic disturbances.
Lininger, Jay	Allen's lappet browed bat Allen's lappet browed bat is among the rarest of North American bats and it relies on large ponderosa pine snags with exfoliating bark for maternal roosting habitat (Rabe et al. 1998, Solvesky 2007). The bat occupies the project area. Human disturbance of roost habitat can cause abandonment and negatively impact reproductive success. Use of tree roosts is common, so the bat is vulnerable to effects of logging and prescribed fire. Large snags that supply critical habitat for Allen's bat may be destroyed by mechanical fuel treatments (Hunter et al. 2007). Prescribed fire may create new coarse woody structure by killing live trees, but any gain	Allen's lappet-browed bat is a sensitive species, not a listed species. Your statement that this bat is among the rarest of North American bats is not supported or even mentioned in either of the references provided for that sentence, i.e., Rabe et al. 1998 or Solvesky 2007. The closest statement in either paper was Solvesky's reference to their seasonal rarity above the Mogollon Rim during their seasonal migration to lower elevations. Similarly, their reference to Hunter et al. (2007) is not applicable to 4FRI because they address fuels reduction treatments in the Rocky Mountains. The status of snags in northern AZ is discussed in the wildlife report (pages 83, 231, 264, and 604). Allen's lappet-browed

in new snags as a result of fire treatments is unlikely to offset their loss as existing coarse wood is irretrievably lost (Randall-Parker and Miller 2002). Rabe and others (1998) report the scarcity of snag habitat at a landscape scale in northern Arizona, and caution that snags are not equally suitable for use by bats. The project area is deficient in snag habitat compared to forest plan standards and guidelines. Any destruction of snag habitat in the project is likely to have cumulatively significant impacts on sensitive wildlife, coarse wood recruitment and forest soils, requiring a hard look in the NEPA analysis.

Mexican spotted owl The project area hosts critical habitat of threatened Mexican spotted owl. Management activities that may affect federally protected species require consultation with the U.S. Fish and Wildlife Service ("FWS") to ensure they will not jeopardize the continued existence of Mexican spotted owl or adversely modify critical habitat, and to secure an exemption for incidental "take," which is otherwise prohibited by the Endangered Species Act ("ESA").[18][18] The project is reasonably certain to cause incidental take of Mexican spotted owl because it would directly impact nest core areas and Protected Activity Centers ("PACs") out of compliance with existing standards and guidelines in the Coconino and Kaibab Forest Plans (USDA 1996), which are designed to maintain owl viability and avoid jeopardy to the species or adverse modification of critical habitat. The Forest Service should disclose implications of this change of course. In October 2008, the Forest Service produced an "Annual Report" to the FWS regarding implementation of forest

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bats are discussed in the wildlife report on pages 58, 123-124, 329, 393-395, 627, 677). The effects analysis for the FEIS (table 76) has been updated to address snags in better detail. While Randall-Parker and Miller (2002) found a net loss of snags, logs, and coarse woody debris after prescribed fire Waltz et al. (2003) (wildlife specialist report pages 222-223) found no statistically significant difference in woody debris pre- and post-burning. This study was more rigorous than Randall-Parker and Miller (2002). They found mixed trends within woody debris categories and observed that the thinning component of their restoration treatments added to ground fuels. Randall-Parker and Miller (2002) only described pre-fire treatments as a pre-commercial thin strategy that removed trees <5" dbh. This is a very different treatment than Waltz et al. (2003) or the treatments proposed by the 4FRI. Post-treatment conditions could be expected to be very different from Randall-Parker and Miller (2002) as well. When drawing on the scientific literature to make comparisons, it is important to select comparable literature or else the science can be misrepresented. The bottom line is that the risk to these forest components is greater from unplanned ignitions. The proposed treatments would reduce this risk. Therefore Randall-parker and Miller (2002) article was not included in the analysis for the DEIS but will be included in the FEIS.
(180-55) See pages 188-324 in the wildlife report for the analysis of effects to Mexican spotted owls. Formal consultation was conducted for this project. The biological assessment for the project was submitted to the FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing key habitat components for MSO and their prey. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project "may affect and is likely to adversely affect MSOs and their habitat, including critical habitat", (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS found the selected alternative will not jeopardize the continued

plans in the Southwestern Region, including the Coconino and Kaibab Forest Plans, for the period of June 10, 2005, through June 10, 2007.[19][19] In it, the Forest Service acknowledged failure to comply with mandatory terms and conditions set forth in the June 10, 2005, FWS biological opinion and incidental take statement that required monitoring of Mexican spotted owl habitat and populations. The Forest Service admitted that it had monitored only 20-to-25 percent of PACs for occupancy, and none for reproduction or juvenile dispersal. In addition, the Forest Service stated that it "likely" exceeded the permitted number of incidental takes of Mexican spotted owl. More, the Forest Service claimed in the Annual Report and in subsequent litigation that incidental take permits for Mexican spotted owl were "difficult" for its personnel to understand and track. On April 17, 2009, the Forest Service asked the FWS to reinitiate consultation on the continued implementation of forest plans in the Southwestern Region, including the Coconino and Kaibab Forest Plans. That letter stated, "It has now become apparent that the Forest Service will likely soon exceed the amount of take issued for at least one species, the Mexican spotted owl."[20][20] More, "[I]t has become apparent that the Forest Service is unable to fully implement and comply with the monitoring requirements associated with the Reasonable and Prudent Measures for several species (including MSO) in the [biological opinion]." On June 22, 2010, the FWS formally reinitiated consultation with the Forest Service on effects of continued implementation of forest plans, including the Coconino and Kaibab Forest Plans, to ESA-listed species.[21][21] Pursuant to that consultation, on March 30, 2012, the FWS produced a new biological opinions and incidental take statements for Mexican spotted owl that are specific to the Coconino Forest Plan (USDI 2012a) and Kaibab Forest Plan (USDI 2012b), respectively. Those opinions and statements eliminated mandatory terms and conditions that previously required the Forest Service to monitor Mexican spotted owl habitat and populations, and replaced them with a more modest requirement to report incidental take (i.e., PAC disturbance) where it occurs. More, the FWS broke precedent and fragmented its consultation on Mexican spotted owl by issuing a separate biological opinion and incidental take statement for each national forest,

existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat (USDI FWS 2014, page 33). The2008 Annual Report discussed by commenter addresses the period of time from June 2005 to June 2007. It does not apply to the 4FRI project which has not yet been implemented. The Biological Opinion and incidental take statement discussed here are no longer in effect for either forest and were replaced for the Kaibab and Coconino NF in March 2012 with a new Biological Opinions for the 1987 and 1988 Forest Plans. In addition, the Kaibab NF is now under a new Biological Opinion signed September 10, 2013 for the Revised Forest Plan. Please note that your comments on the March 2012 Biological Opinions for the Coconino and Kaibab NFs are opinions that do not require a reply. Monitoring that is associated with the Coconino and Kaibab forest plans are part of the plan amendments in appendix B. Monitoring for the project effects is based on the monitoring requirements in the 4FRI Biological Opinion (see appendix E). The comments regarding fire suppression and emergency consultation with FWS do not apply to this project.

including the Coconino and Kaibab National Forests. None of the newer forest-specific biological opinions regarding implementation of forest plans in the Southwestern Region account for range-wide impacts to Mexican spotted owl and critical habitat, and none require monitoring of population or habitat trends, which remain unknown. In our view, Forest Service compliance with terms and conditions of the March 30, 2012 biological opinions and incidental take statements for the Coconino and Kaibab Forest Plans will fail to avoid jeopardy to Mexican spotted owl or adverse modification of critical habitat because the conservation status of the species and the effect of ongoing forest management throughout its range, including the instant proposed action, is unknown. In addition, compliance with terms and conditions of the March 30, 2012 biological opinions and incidental take statements will not meet the independent obligation of the Forest Service under the National Forest Management Act to monitor changes in owl populations and habitat, as required by the Coconino and Kaibab Forest Plans. In 2011 and 2012, a number of large wildfires and related fire suppression activities in the Southwestern Region may have adversely affected Mexican spotted owl and its critical habitat. These include the 538,000 acre Wallow fire on the Apache-Sitgreaves National Forests, the 222,954 acre Horseshoe Two fire and the 68,078 acre Murphy Complex fires on the Coronado National Forest, the 156,593 acre Las Conchas fire on the Sante Fe National Forest, the 297,845 acre Whitewater-Baldy Complex fires on the Gila National Forest, and the 44,330 acre Little Bear fire on the Lincoln National Forest. For each of these wildfire events, the Forest Service used fire suppression techniques, including igniting back burns, fireline construction and aerial deployments of chemical fire retardant (see Backer et al. 2004). A combination of the large-scale wildfires and the Forest Service's fire fighting tactics may have resulted in adverse impacts and the taking of Mexican spotted owl. The Forest Service and FWS have not consulted, pursuant to Section 7 of the ESA, to assess the potential adverse effects to MSO and its critical habitat resulting from the 2011 and 2012 wildfires and associated impacts.

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All of the action alternatives in the DEIS would amend standards and guidelines of the Coconino and Kaibab Forest Plans, respectively, for

(180-56) Not all action alternatives in the DEIS will allow mechanical removal of trees up to 18-inches in 18 PACs. Alternative B would only

Mexican spotted owl by: (1) allowing mechanical removal of trees up to 18-inches diameter on 7,353 acres in 18 PACs; (2) allowing management-ignited fire in 56 PAC "core areas" (~5,600 acres); (3) removing limits on PAC treatments to 10 percent increments in each recovery unit; (4) deleting language that requires selection of an equal number of untreated PACs as controls; (5) repealing the requirement to monitor owl populations and habitat; (6) allowing designation of less than 10 percent of Restricted Habitat for management as "target" or "threshold" habitat (i.e., nesting and roosting habitat); and (7) permitting retention of as little as 110 ft^2/acre basal area on 6,321 acres of Restricted Habitat. See DEIS at 500-518 (Alternative C – "Amendment 1" to Coconino Forest Plan); 549-561 (Alternative C – "Amendment 3" to Kaibab Forest Plan). The need for the plan amendments described above is a significant issue for analysis due to the controversial and uncertain efficacy of proposed treatments in promoting the conservation and recovery of Mexican spotted owl (USDI 1995, 2012c). The Forest Service is required by NEPA to fully disclose controversy and uncertainty regarding effects of the project to Mexican spotted owl and its critical habitat. Its analysis must take a hard look at explicit cautions in the revised Recovery Plan for Mexican spotted owl (USDI 2012c) regarding proposed activities and offer a good-faith and reasoned response to them. Furthermore, the Forest Service must disclose in detail the "MSO PAC field reviews, data evaluation, and vegetation simulation modeling" it used to determine that there is a need to mechanically thin trees larger than 9-inches diameter in PACs. Remarkably, the Forest Service states that these plan amendments are "a specific, onetime variance" for management of Mexican spotted owl habitat, and "the language proposed does not apply to any other forest project." DEIS at 500. That statement clearly is misleading to public understanding because the agency simultaneously proposes to amend the Coconino Forest Plan in concurrent projects that will cumulatively unravel existing management direction for Mexican spotted owl and the basis of prior FWS biological opinions. For example, the proposed action for the "Mahan-Landmark Project" contains a plan amendment that would allow "timber harvest" in PACs, including removal of trees up

allow trees up to16-inches to be removed in the same PACs (DEIS page 447). The rest of the plan amendments are consistent between all of the action alternatives. On the Coconino NF, the amendments authorized (alternative B-D) mechanical treatments in MSO PACs that exceed 9 inch d.b.h. and authorize the use of prescribed fire in MSO PAC core areas (alternative C). In alternatives B-D all MSO existing monitoring requirements were removed and specific monitoring requirements were deferred to the FWS biological opinion. The MSO plan amendments were developed in conjunction with USFWS to be more in compliant with the intent of the 2012 revised recovery plan and to best improve habitat conditions for the MSO across the project area. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014).The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51). With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a

to 16-inches diameter, contrary to existing standards and guidelines. In addition, the proposed action for the "Flagstaff Watershed Protection Project" would: (1) repeal the plan's 9-inch diameter limit on mechanical thinning in PACs; (2) delete timing restrictions on forest treatments in PACs; (3) allow logging and burning in nest core areas; (4) remove the 24-inch diameter limit on timber harvest in Restricted Habitat; and (5) excuse itself from the requirement to monitor Mexican spotted owl populations and habitat. The forest plan amendments in all of these projects are similar or identical, yet the Forest Service states – in duplicative language – that each is "specific," and does "not apply to any other forest project." The Forest Service is required to take a hard look at the cumulative effect of these concurrent and controversial plan amendments on threatened species and critical habitat. The monitoring element of plan amendments affecting Mexican spotted owl is controversial because the Forest Service admitted in its October 2008 Annual Report to FWS that it lacked funding and personnel to conduct required monitoring of owl habitat and populations to ensure that its actions would not jeopardize the continued existence of the species or adversely modify critical habitat. [22][22] And again, the Forest Service proposes to eliminate the monitoring requirement of the forest plans in other projects. Given its failure to monitor Mexican spotted owl under binding terms and conditions of an incidental take statement, we have specific questions about the monitoring plan for this project that should be addressed in the EIS, namely: (1) criteria for selection of PAC as paired treatment and control sites; (2) criteria for selection of measurable indicators of change; (3) sampling design power analysis and expected observational error rates; (4) sampling procedures including monitoring cycle; (5) confidence levels to be applied in data analysis and reporting; (6) timeframe for evaluation of results; and (7) triggers for management adaptation using new information. The complete monitoring plan, including study design and analysis protocols, should be made available for public review and comment before a decision is made to implement the project.

specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. As noted above, the purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. The amendment would not alter multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310) and bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C), the MSO amendment (Amendment 1) would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. For this reason, the amendment would not result in an important effect to the entire land management planning area. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). Regarding cumulative effects, in the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and

ongoing projects by the FS and identified each project by National Forest and Ranger District. Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 – 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 – 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 – 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321). The above actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects analysis for MSO was revised. The FEIS wildlife report states, “Because of the size of the 4FRI analysis area and the large portion of the western UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects” (Wildlife Report, page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers. comm. 2006). Wildlife habitat in the form

Lininger, Jay	Furthermore, to comply with NEPA, the Forest Service must study, develop and describe (rather than mention and dismiss) an action alternative that gives the decisionmaker and the public a meaningful basis for comparison of impacts to Mexican spotted owl and its critical habitat. At a minimum, such an alternative should: · Implement existing forest plan standards and guidelines without amendment. · Avoid road construction in PACs. · Incorporate treatment concepts outlined below, including large tree retention, management of surface fuels and sub-canopy forest structure, and spatial orientation. · Apply spatial modeling of different intensities and configurations of treatments in Mexican spotted owl habitat, as demonstrated by Northern Arizona University Forest Ecosystem Restoration Analysis (Prather et al. 2008). The work of Prather and others (2008) is particularly relevant to this analysis because it is: (1) specific to the project area; (2) consistent with the purpose and need; (3) representative of the best available science; and (4) offers a meaningful basis for comparison of the intensity of environmental impacts that may result from the project. "[E]ven without application of treatments that would seriously affect MSO habitat, managers could achieve approximately 60% of the fuels reduction that would be achieved if there were no restrictions on treatments. With	of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, table 153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page 400 to page 412 of the wildlife report. (180-57) Please see our previous response (180-56). Alternative E was developed in response to comments on the DEIS. Alternative E proposes no forest plan amendments on the Coconino NF. No forest plan amendments remain for the Kaibab NF in the FEIS. Regarding roads in MSO habitat, the temporary road/protected habitat discussion in the wildlife report (page 202) states that all temporary roads in PACs currently function as open roads and would be decommissioned project implementation. The impacts from the temporary roads within the PACs are part of the MSO consultation. No old trees would be removed in PACs because of the use of temporary roads. The comment states that temporary roads would decrease by 2.79 miles in MSO critical habitat, but table 56 (page 207 in the wildlife report) displays a total of nearly 67 miles proposed for decommissioning in MSO critical habitat. The comment states total road mileage would increase by nearly 2 miles, with over a mile of additional road in Bonita Tank PAC and references tables 213-215 in the wildlife report. Table 213 displays a total of 48 miles decommissioned in PACs (20% of the total) with no change in Bonita PAC. Table 214 shows miles of road decommissioned in core areas (nearly 5 miles of the almost 20 total miles would be decommissioned in PACs or nearly 25%) with no mention of Bonita Tank. Table 215 shows 6.04 miles of temporary road construction in

reasonable tradeoffs considered in planning, such as largely treating in lower suitability owl habitat, this figure would rise to over 80%" (Prather et al. 2008: 148). "When conservation and restoration planning is scaled-up from a stand to landscape scale, many apparent conflicts disappear as management actions are spatially partitioned and prioritized" (Prather et al. 2008: 149). All of the action alternatives include 6.04 miles of new road construction in 13 PACs. See Fletcher and others (2012: 749-55). The revised Recovery Plan for Mexican spotted owl (USDI 2012c) specifically recommends against this activity: "New road or trail construction is not recommended in PACs" (USDI 2012: 274); also see id. 261 ("We recommend that no new roads or construction occur in PACs"). The FWS qualifies its recommendation, stating: "New road construction should be avoided whenever possible, and temporary road and skid trail construction should be designed to minimize impacts on soil integrity and natural recovery processes. All new and temporary roads and skid trails should be decommissioned and obliterated after use" (USDI 2012c: 264). However, new road construction may adversely affect primary constituent elements of Mexican spotted owl critical habitat, and this is a significant issue for analysis. The Forest Service must cease its practice of refusing to disclose the location and effects of new road construction and take a hard look at potential site-specific impacts to the environment. New roads may destroy large trees and coarse woody structure, permanently impair soil productivity and alter plant communities, and even if their use is temporary. This may cause incidental take of Mexican spotted owl and/or necessitate removal of old growth trees, but the DEIS fails to address either point. Decommissioning of proposed temporary roads will decrease overall road density in Mexican spotted owl critical habitat by 2.79 miles at the project scale, but total road mileage will increase by 1.92 miles in four PACs after the project is fully implemented, especially in the Bonita Tank PAC (+1.17 miles). See Fletcher and others (2012: 749-55) (Tables 213- 215). New road construction will occur in three PACs where existing road mileage is not reported: Coulter Ridge PAC (1.76 miles of new road); Upper West Fork PAC (0.01-mile new road); and Volunteer PAC (0.07-mile new road). Id. The existing condition of critical habitat and

PACs, including the 3 referenced PACs. However, this table does not reference new road construction. As described above, all temporary roads in protected habitat currently exist on the ground and will be decommissioned after project completion (Page 202 of the wildlife report). The comment states that total miles are not reported for the 3 PACs identified, but the 1st table they reference from the wildlife report includes the column heading "Total Road Miles in PAC." It also shows the percent of total proposed for decommissioning by PAC (20% of total roads currently existing in PACs would be decommissioned) Pages 155, 156, 158 of the wildlife report also address this topic by alternative. The work of Prather and others (2008) is particularly relevant to this analysis because and was not included in the analysis because they focused on potential conflicts between the desire to reduce the likelihood of uncharacteristically severe wildfire and the concurrent desire and legal mandate to manage forests for the recovery of the owl. The 4FRI is not a fuels reduction project and instead the focus of the 4FRI is to move the forest towards restoration of structure, pattern and composition. The existing forest plans at the start of the 4FRI effort only allowed management actions that reduced fuels and for firewood collection. The treatments in MSO habitat were not designed to reduce fire risk, which is why there is an amendment to the plans for treatments intended to improve MSO habitat. The comment quotes a finding of Prather et al. (2008) regarding the strategy of "largely treating in lower suitability owl habitat," which is exactly what is proposed in the DEIS (pages 51-53, 235, 240, 443-444, 455, and 500-501). Prather et al. (2008) also concluded "management treatments that emphasize ecosystem restoration might improve the suitability of large areas of forest habitat in the southwest that is currently unsuitable for owls. These results demonstrate that even where policy conflicts exist, their magnitude has been overstated. Active restoration of dry forests from which fire has been excluded is compatible in many areas with conservation and recovery of the owl." We agree with the conclusion that "When conservation and restoration planning is scaled-up from a stand to landscape scale, many apparent conflicts disappear as management actions are spatially partitioned and prioritized." Their findings will be added to the FEIS.

environmental consequences of the project remain undisclosed there. The FWS has documented incidences of Mexican spotted owls being hit by motor vehicles on unpaved roads (USDI 2012c: 29, 229). "[R]oads and trails through PACs may fragment habitat continuity, alter natural movement patterns, and increase disturbance to resident owls. Roads in nest/roost, forested, and riparian recovery habitat may also result in loss of habitat components (e.g., large logs, large snags, hardwoods) as people access these areas for fuelwood cutting, and in sensitive riparian areas, roads and trail can inhibit hydrological processes that affect proper functioning ecological conditions" (USDI 2012c: 45). Noise associated with road maintenance in PACs may harass Mexican spotted owls and decrease their reproductive success (USDI 2012c: 234-35). Road construction All of the action alternatives include significant new construction of 517 miles of road and reconstruction of 30 miles of existing roads. See DEIS at 74 (Table 18). This is a significant difference from the proposed actions for this project on which the Center previously commented. In particular: · The proposed action would have decommissioned 1,111 miles of existing and unauthorized roads, whereas the DEIS action alternatives would only decommission 904 miles. · The proposed action included only 183 miles of temporary road construction, but the DEIS action alternatives would construct 517 miles of new road. The Forest Service previously communicated to the public that "very little" new road construction would be needed to implement proposed treatments. In fact, the Forest Service staked its unilateral modifications to the collaborative Old Growth Protection and Large Tree Retention Strategy, discussed above, on the premise that road construction would not be extensive in this project. Road building is one example cited by the agency when old growth trees may be removed. See DEIS at 644. New road construction may significantly impact soils and water quality, and this is a significant issue for environmental analysis. The Forest Service must cease its standard practice of refusing to disclose the location and effects of new road construction and take a hard look at potential site-specific impacts to the environment, as required by NEPA. New roads and ground-based logging activities may cause significant losses of soil productivity (Gucinski et al. 2001: 21)

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(180-58) There has been changes in the proposed road system as a result of conducting extensive analysis since 2011 when scoping occurred. Since the DEIS was published in 2013, other projects that affect the road system within the 4FRI boundary have been completed or address roads separately. The Kelly Trails project and the Flagstaff Watershed Protection Project reduce the total miles of road decommissioning within the 4FRI project boundary by approximately 45 miles from what was proposed in the draft environmental impact statement. The original Proposed Action that was scoped in January and August of 2011 had a total of 941 miles of road needed for decommissioning on the Coconino and 170 miles of decommissioning on the Kaibab. These mileages were changed to 722 miles needed on the Coconino and 134 miles on the Kaibab. The 722 miles on the Coconino were further reduced by 45 miles from the draft EIS to the final EIS. In the March 2011 proposed action, we identified about 2,218 miles of Forest Service system roads that would be needed for haul routes and approximately 49 miles of Federal, State and County roads that are within the project boundary that would be used for haul routes. In sum, about 2,787 miles of road is necessary to fully implement the project. Approximately 517 miles of temporary road construction was identified in the DEIS (DEIS, chapter 2). In the FEIS, the number was increased by 3 miles to 520 miles. No new permanent roads would be constructed for this project. Temporary roads would be constructed to provide necessary access for forest treatments and

("Losses of productivity associated with road-caused, accelerated erosion are site specific and variable in extent, but they are commonly reported for all steepslope landscapes."). New roads can permanently impair soil productivity even if their use is temporary (Trombulak and Frissell 2000). Road-related soil erosion is a chronic source of sediment production that can limit water quality (Bowman 2001, Gucinski et al. 2001). The distance that sediment travels is an important factor in determining how much eroded soil is delivered to a water body. Soil loss and erosion occurring closer to a stream have greater potential to deliver sediment and lead to water quality impairment than erosion triggered farther away from streams. For this reason, road-stream crossings have high potential to adversely impact water quality (Endicott 2008). In addition, road construction and fuel treatments may combine to increase overland water flow and runoff by removing vegetation and altering physical and chemical properties of soil, which can permanently alter watershed function (Elliot 2010, Robichaud et al. 2010). This has implications for the purpose and need to protect municipal water supplies from socially undesirable effects of flooding and erosion. The extent and location road construction and its effects to soil erosion, runoff channelization and suspended sediment loads merit a hard look in the analysis. To comply with NEPA, the Forest Service must study, develop and describe (rather than mention and dismiss) an action alternative that foregoes road building on steep slopes and sensitive soils where it may increase erosion or impair productivity. 40 C.F.R. § 1502.14. Such an alternative would provide the decision-maker and the public with a meaningful basis on which to compare environmental impacts. See Steinke (2013: 90) (in all action alternatives, 22 miles of new road construction would occur "on severe erosion hazard soils"). Project design features may fail to mitigate significant cumulative effects (Endicott (2008: 93) ("… [A] lack of science to validate [Best Management Practices] effectiveness has been noted as a shortcoming of many BMPs related to forest roads…"). New roads directly remove and cumulatively fragment wildlife habitat, and they indirectly contribute to biological invasions of noxious weeds (Gucinski et al. 2001). Significant cumulative effects of road construction are foreseeable because similar activity will

decommissioned after use. The effects of roads are analyzed and disclosed in chapter 3 of the DEIS. Appendix C provides design features, BMPs, and mitigation measures to protect soils and water quality as they relate to roads. The Riparian and Water Quality Specialist's Report provides a detailed description of the effects of forest roads on page 50 and 62-64. In response to comments on the DEIS, a new design feature which addresses activities on soils with severe erosion hazard was developed. Design feature SW43 (FEIS Appendix C) was developed to protect long-term soil productivity and water quality: "Provide soil and site protection on newly disturbed soils located on temporary roads on soils with severe erosion hazard as needed. Avoid locating temporary roads on soils with severe erosion hazard. Where unavoidable, provide soil protection through implementation of any of the following methods to control sediment and protect water quality. Methods may include, but are not limited to: wattling, hydromulching, straw or woodshred mulching, spread slash, erosion mats, terraces, blankets, mats, silt fences, riprapping, tackifiers, soil seals, seeding and side drains, and appropriately spaced water bars or water spreading drainage features. Temporary roads would be decommissioned and protected with any of the above methods". A new design feature was developed (FEIS, Appendix C) to clarify temporary roads would be decommissioned by the purchaser/contractor when mechanical treatments are finished using the adaptive management actions listed in Appendix A of the Transportation Specialist. See the previous response (180-57) as it relates to roads and MSO habitat. Nearly 100 miles of road maintenance and temporary road construction would occur in protected habitat (FEIS wildlife report, Table 57). Road maintenance and temporary construction would occur pre-harvest and outside of the nesting season. Please see our previous responses on the conservation of old growth.

Lininger, Jay	occur in the FWPP, Hart Prairie, Mahan-Landmark, Marshall, Upper Beaver and Wing Mountain projects. Water quality Pursuant to the Clean Water Act, each federal agency must comply with all Federal, state and local requirements concerning the control and abatement of water pollution. 33 U.S.C. § 1323(a). The project area includes several water bodies that have been designated as water quality impaired pursuant to Section 303(d) of the Clean Water Act, particularly for mercury in fish tissue: Upper and Lower Lake Mary, Soldiers, Soldiers Annex, and Lower Long Lakes. According to page 41 of the Water Quality and Riparian Areas Specialist Report, "The [Arizona Dept. Environmental Quality – "ADEQ"] has concluded that watershed loading can potentially be reduced through management of sedimentation and vegetative stability. Recommendations included a review of upland and drainage conditions, so that areas requiring soil stabilization measures and channel improvements may be identified." The report further states on page 70: Short-term, localized adverse effects to surface water quality are possible in ephemeral drainages within or adjacent to high intensity treatment areas, Subwatersheds [sic] with greater treatment acreages, such as Walnut Creek-Upper Lake Mary (8,334 treatment acres), Upper Spring Valley Wash (7,369 treatment acres, and Volunteer Canyon (6,249 treatment acres) pose the highest risk of short term, localized adverse effects to water quality. Potential adverse effects include increases in turbidity, total dissolved solids, total suspended solids, and nutrients. Implementation of BMPs and SWCPs as specified in Table 1 would minimize adverse effects to surface water quality and riparian ecosystem function. The report is forthright on pages 44-45, 69 and 75 about the risks to riparian and aquatic systems from road construction and use in the project. Roads, skid trails and landings present a clear risk to riparian and aquatic habitats for increasing sedimentation, erosion, and turbidity, and they may cause the Forest Service to violate Total Maximum Daily Load ("TMDL") restrictions on water pollution. Therefore, the report admits on page 9, "Cumulative effects to water quality and riparian areas, when combined with past, present, and reasonably foreseeable future actions could be significant." The 4FRI project will be implemented simultaneously	(180-59) Implementation of BMPs and SWCPs as specified in appendix C of the DEIS would minimize adverse effects to surface water quality and riparian ecosystem function. Additionally, Appendix C provides design features, BMPs, and mitigation measures to protect soils and water quality as they relate to mechanical forest treatments, prescribed fire, and roads. These practices have generally been shown to effectively minimize and mitigate adverse effects to soil productivity and water quality when properly implemented. As described on pg. 70, para. 4 in the Riparian and Water Quality Specialist's Report, It is unlikely that any of the Action Alternatives would contribute enough sediment or other pollutants to ephemeral or intermittent drainages within the project area to result in impairment of any downstream water bodies. The Kelly Motorized Trails Project was included in the cumulative effects analysis as a reasonably foreseeable recreation project in the soils and water quality and riparian analysis. In the DEIS the cumulative effects analysis is summarized in pages 120-121. In the FEIS (in response to comments on the DEIS), more of the analysis has been included in chapter 3 to improve clarity, see pages 149 to 152.

with the construction of the Kelly Motorized Trails Project. The Kelly project will bring increased usage to lands south of Lake Mary, and are likely to bring increased motorized traffic to the roads surrounding the Kelly trails. During and after 4FRI implementation, national forest lands will be opened to recreational motorized traffic with a significant but undisclosed mileage of newly constructed roads and reopened roads around Lake Mary. How will the Forest Service limit the cumulative effects of these two projects? How will it prevent trespass from the Kelly project onto roads used for the 4FRI project? How will it pay for increased enforcement and the need to completely obscure closed and re-closed roads after 4FRI project implementation? The Forest Service must describe cumulative impacts of the Kelly project and 4FRI project and offer a plan for controlling motorized vehicle traffic onto the roads to be constructed and used in the action alternatives. The plan should account for the costs of thoroughly obliterating and completely obscuring roads around the Kelly project area. The Forest Service should also offer a contingency plan should TMDL levels in Lake Mary increase as a result of the two projects. In sum, the DEIS fails to demonstrate how the 4FRI project, along with all other connected, cumulative and similar actions, will meet all Federal, state and local requirements, including state water quality standards, as required by the Clean Water Act. 33 U.S.C. § 1323(a).

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Fire management The intensity of wildland fire behavior and the severity of its physical and biological effects to vegetation, soil, water quality and wildlife habitat depend, in part, on fuel properties and spatial arrangement. Fuel bed structure is a key determinant of fire ignition and spread potential and a central consideration in developing an effective management strategy (Graham et al. 2004). The bulk density (weight within a given volume) of ground fuels (e.g., grasses, shrubs, litter, duff, and down woody material) influences frontal surface fire behavior (heat output and spread rate) more than fuel loading (weight per unit area) (Agee 1996, Sandberg et al. 2001). In turn, surface fireline intensity dictates the likelihood of tree crown ignition and torching behavior (Scott and Reinhardt 2001). The density, composition and structure of intermediate fuel strata consisting of tall shrubs and small trees also affect crown fire ignition

(180-60) We agree that crown fuel structure is a critical component for predicting the potential for crown fire. The Crown Bulk Density (CBD) metrics used are from FVS outputs, determined from Common Stand Exam data. The desired condition for CBD is based on the Rim Lakes analysis (Nicolett, 2011), for which a similar analysis was done. An average across the treatment area is a very coarse measure intended to indicate movement towards desired conditions. It is expected that there would be a great deal of variability within the treatment area. The stand data used is located in the project record in the silvicultural data and in the fire modeling data. Stand data were used to inform the Landfire data used for fire modeling. Stand data are the best data available for modeling forest structure. In the process of the fire modeling, multiple field trips were taken to verify, to the degree possible over 600,000 acres, the accuracy of the data. The literature cited for the sentence:

potential because they can support surface fireline intensity and serve as “ladders” that facilitate vertical fire spread from the ground surface into overstory tree canopies. The size of the spatial gap in between ground fuel beds and tree canopies strongly influences the crown ignition potential of a surface fire (Graham et al. 2004). Van Wagner (1977) quantified crown fire ignition rates when surface fires exceed critical fireline intensity relative to the height of the base of aerial fuels in tree crowns. Torching crowns (i.e., “passive crown fire”) can develop into running canopy fires (i.e., “active crown fire” that spreads independent of surface fire behavior) if the spread rate surpasses a crown fuel density threshold that varies with slope angle and wind speed. Reducing the likelihood of active crown fire behavior on steep slopes or in extreme weather may require heavy thinning of dominant trees, depending on pre-treatment forest structure and degree of acceptable risk, and this is an element of the proposed action. See DEIS at 24 (“Approximately 61 percent of the ponderosa pine in the project area has a canopy bulk density rating greater than 0.050 kilogram per cubic meter (kg/m³). The desired condition in ponderosa pine to reduce the potential for crown fire is to have canopy bulk density below 0.050 kg/m³.”); 160 (Table 59 – canopy characteristics for ponderosa pine forest by alternative). Predictions about the relationship of forest structure to crown fire hazard depend, in part, on the validity of crown bulk density calculations and estimates (Perry et al. 2004). The environmental analysis should ensure professional and scientific integrity with site-specific information based on field observations (Weatherspoon and Skinner 1995). Active management of the arrangement and volume of surface fuels and “ladder fuels” is effective at minimizing potential fire intensity in most circumstances (Graham et al. 2004, Graham et al. 1999). Some advocates contend that removing large or dominant trees can reduce crown bulk density and lessen fire resistance-to-control in extreme weather (Abella et al. 2006). Others question the premise of that contention on the basis that fire weather can overwhelm any effect of fuel treatments on fire behavior (e.g., Perry et al. 2004, Pollett and Omi 2002). To accurately assess fuel treatment effects on the likelihood of crown fire initiation and spread, it is necessary to consider: (1) surface fuel density and

The environmental analysis should ensure professional and scientific integrity with site-specific information based on field observations (Weatherspoon and Skinner 1995) is a study from Northern California that determined Fire Damage Classes (FDC) for a variety of forest types based on scorch and consumption of tree crowns in plantations and in uncut and partial-cut stands. They used aerial photos to determine crown damage. They had no site-specific data, and did no ground truthing of their data because “…To do an adequate job of on-site sampling of the large area and great diversity of conditions included in our study would have required time and resources far beyond those available to us…”. Their conclusion was “Thus the variability of fuels within the strata, and associated variability in fire behavior and fire damage, evidently were sufficient to mask any detectable effect of recorded fuel loadings”. If this assumption is correct, it points to a need for more site-specific data on fuels.”

arrangement; (2) canopy base height; (3) local topography; and (4) weather patterns (Graham et al. 2004, Hunter et al. 2007). The former two factors can be actively managed in ponderosa pine and dry mixed conifer forest to significantly decrease the likelihood of crown fire initiation and spread without resort to large tree removal in most cases (Fielder and Keegan 2002, Keyes and O'Hara 2002, Omi and Martinson 2002, Perry et al. 2004, Pollett and Omi 2002).

Perry and others (2004) investigated the relationship of forest structure to severe fire effects in ponderosa pine forests of the eastern Cascade Range. Even in areas far departed from historical conditions, "[T]here may be a great deal of landscape heterogeneity in the degree of risk and the treatments required to lower risk …" (Perry et al. 2004: 923). Fuel treatments that reduced surface fuel volume by fifty percent (50%) without any tree thinning prevented torching behavior in 13 of 14 experimental plots with modeled wind speeds exceeding 90th percentile conditions for the study area. A "light thinning" of trees smaller than 12-inches diameter coupled with surface fuel reduction prevented torching in the last plot (Perry et al. 2004: 924). Those results agree with Forest Service observations from the 2002 Hayman fire in Colorado, where active crown fires dropped to the ground upon encountering areas that had been treated with prescribed fire to reduce surface fuels and kill small trees (Graham 2003). Omi and Martinson (2002) measured the effect of fuel treatments on fire severity in highly stratified forest sites in the western United States and reported a strong correlation of crown base height with "stand damage" by fire. Importantly, crown bulk density did not strongly correlate with observed fire effects: [H]eight to live crown, the variable that determines crown fire initiation rather than propagation, had the strongest correlation to fire severity in the areas we sampled... [W]e also found the more common stand descriptors of stand density and basal area to be important factors. But especially crucial are variables that determine tree resistance to fire damage, such as diameter and height. Thus, "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management. Omi and Martinson (2002: 22). That research was retroactive and the scale of observed fire events confounds

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(180-61) Omi and Martinson found that cbd did correlate with observed fire effects, specifically crown scorch, a significant indicator of tree mortality. Omi and Martinson (2002) stated: "Agee (1996) has suggested a crown bulk density threshold of 0.1 kg/ha as a general determinant for active crowning under extreme fire conditions. It is notable that all of our treated areas averaged at or below this threshold, while all untreated areas averaged above…However, crown bulk density was not the fuel hazard variable most strongly correlated to fire severity at our study sites; in fact it was significantly correlated only to crown volume scorch. Instead, height to live crown, the variable that determines crown fire initiation rather than propagation (Van Wagner 1977), had the strongest correlation to fire severity in the areas we sampled. Like Pollet and Omi (2002), we also found the more common stand descriptors of stand density and basal area to be important factors. But especially crucial are variables that determine tree resistance to fire damage, such as diameter and height. Thus, "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management." Fire modeling, a necessary part of this kind of NEPA, does not use stand density or basal area. It is difficult to monitor the change in crown fire potential (active or passive), since the real test comes in the form of a wildfire, so modeling changes to fuel characteristics are often used as a proxy. Canopy bulk density is an important variable in modeling fire for determining the potential for active crown fire (Stratton 2009). We agree that managing fuel loading and structure are critical components of restoration. The components listed (surface fuel structure, canopy base height, topography, and weather), are the components in the fire behavior triangle: fuel, topography, weather. This is basic fire behavior science, and is included in the analysis and in the modeling that was used. If large trees are

replication. However, it noted that results can be extrapolated to sites other than those studied, and its observation that large trees promote fire resistance is supported by Forest Service research (e.g., Arno 2000). A key implication is the importance of treating fuels "from below" in order to prevent widespread occurrence of stand-replacing fires (Omi and Martinson 2002). Keyes and O'Hara (2002: 107) agreed that raising canopy base height is an important factor in reducing fire hazard and noted, "[P]runing lower dead and live branches [of large trees] yields the most direct and effective impact." They also noted the incompatibility of open forest conditions created by "heavy" thinning treatments designed to maximize horizontal discontinuity of forest canopies with management objectives to conserve threatened wildlife populations and prevent rapid understory initiation and ladder fuel development. Understory growth following treatments that create open forest conditions may undermine their long-term effectiveness without commitments to maintenance treatments (e.g., prescribed fire).

Alternative C proposes mechanical treatments on up to 45,000 acres annually, but it proposes management-ignited prescribed fire on only up to 40,000 acres each year. See DEIS at 80-81; also see Fletcher and others (2012: 244) ("Mechanical thinning and prescribed burning would take place at different times in different locations").

Alternative D would implement mechanical logging treatments on more than double the acreage where it proposes to ignite prescribed fires. Id. 88 (mechanical thinning on 388,489 acres; prescribed fire on 178,790 acres). Mechanical logging in lieu of prescribed fire does not reduce the pre-existing surface fuel load. Id. 24 ("Mechanical treatments generally do not remove surface fuels from a treatment area, so they remain a potential source of heat (fire effects) and emissions."). Where mechanical treatments would occur in the absence of prescribed fire, the Forest Service proposes to manage activity-created fuels (i.e., "slash") with machine piling, lopand-scattering and pile burning. Id. 263 ("A 30 percent reduction of prescribed fire would leave a significant amount of post-thinning debris and slash on the forests. Without prescribed fire, actions identified in the alternative such as chipping, shredding, mastication, and offsite removal of material would be required."). Those actions removed, it would be under conditions described in the incorporation of the Large Tree Retention Strategy which was written by the Stakeholder group.

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(180-62) Changes in fuel loading were analyzed by alternative and the effects to potential fire behavior were disclosed (DEIS pages 23 – 24; 160 – 161, and in the Fire Ecology/Air Quality Specialists' report in Methodology, Metrics, Canopy Characteristics and Surface Fuel Loading; Under each Alternative under Surface Fuel Loading, and in the Summary of Alternatives). The assumption is that the KNF and COF average about 20,000 acres of wildfire a year, and prescribed fire would be used to supplement acres burned in wildfire in order to average 60,000 acres of fire a year. We agree that Alternative D does not provide the benefits of fire that Alternatives B, C, or E do, and potential emissions are greater in Alternative D than in B, C, or E. Alternative E was developed in response to comments on the DEIS.

are not likely to reduce the elevated fire hazard that results from creation of activity fuels because mechanical logging generates large quantities of slash fuels by relocating tree stems, branches and needles from the overstory canopy to the ground surface (Graham et al. 2004, Stephens 1998, van Wagtendonk 1996, Weatherspoon and Skinner 1995). Logging slash produces higher flame lengths and more intense surface fires that can increase the probability of crown fire initiation compared to fuels that pre-exist logging operations (Dodge 1972, Naficy et al. 2010, Stephens and Moghaddas 2005). According to the Congressional Research Service, Timber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these “fine fuels” on the forest floor increases the rate of spread of wildfires. Thus, one might expect acres burned to be positively correlated with timber harvest volume.[23][23] Mechanical treatments in all action alternatives will immediately increase the density and volume of fine fuels on the ground surface up to 15 or more tons per acre, depending on pretreatment forest structure, which will increase fire resistance-to-control and make wildfires more dangerous and severe where activity fuels are not effectively managed. Van Wagtendonk (1996) modeled the effectiveness of low thinning combined with a pile-andburn slash treatment on flat ground, which yielded nearly identical post-treatment fire behavior as thinning without any slash treatment because pre-existing surface fuels were not significantly reduced. Lop-and-scattering of logging slash “significantly increased subsequent fire behavior” (van Wagtendonk 1996: 1160). Activity fuels may persist for decades: In both even aged and un-even aged treatments, it is often assumed that harvest related slash will decompose over time thereby reducing fire hazards. In reality, logging slash may persist for long periods, and therefore, will influence fire hazards for extended periods. Rates of woody fuel decay are highly variable (Lahio and Prescott, 2004). The rates of decomposition of understory fuels are primarily dependant upon several factors including temperature, soil moisture, insect activity, and material size (Lahio and Prescott, 2004). Decaying conifer activity fuels have been reported to persist for 30 years in xeric forest

environments (Stephens, 2004). Stephens and Moghaddas (2005: 377). Prescribed burning is the only treatment that effectively reduces activity fuels and fire hazard below pre-logging conditions (Stephens 1998, van Wagtendonk 1996). “Periodic underburns and programs for restoring natural fire are critical to maintain these post-harvest stands” (Pollett and Omi 2002: 9). Burning is uniquely effective because fire consumes the finest and most ignitable activity fuels that pose the greatest hazard (Deeming 1990).

The Forest Service is required to disclose potentially significant effects of the project on public health and safety, including wildland fire control efforts. It should take a hard look at post-logging fuel profiles and fire hazard at a unit-scale, particularly on steep slopes where prescribed fire may not be used, rather than generalizing them across the project area. Sitespecific field data collection and reporting is a fundamental professional standard for fuel management in this project: Mapping should utilize the best sampling strategies combining remote sensing imagery (perhaps at several scales) and ground truthing. The reliability of existing vegetation maps should be verified before they are incorporated into the database. Fire-relevant attributes of vegetation (including understory composition and structure, and vertical and horizontal continuity) need to be characterized adequately. Similarly, surface fuels should be described, utilizing field-verified vegetation/fuels correlations to the extent feasible. Weatherspoon and Skinner (1996: 1488). The analysis should disclose how much slash would remain on the ground after logging is completed and take a hard look at the effectiveness of different activity fuel treatments at the sites to be treated. The direction of fire spread (backing, flanking, heading) is an important consideration because fire interacts with weather, topography and vegetation to “back” and “flank” around certain conditions, or “head” through others as it spreads (Graham et al. 2004). Steep slopes can facilitate wind-driven convection currents that drive radiant heat upward and bring flames nearer to adjacent, unburned vegetation, thus pre-heating fuels and amplifying fire intensity as it spreads upslope (Whelan 1995). As a result, severe fire effects often are observed to concentrate at upper slope positions and on ridges, whereas such effects are relatively rare on the lee side

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(180-63) Discussions and data on fuel loading and the expected effects and behavior are provided in the DEIS pages 23 – 24; 160 – 161, and in the Fire Ecology/Air Quality Specialists’ report in Methodology, Metrics, Canopy Characteristics and Surface Fuel Loading; Under each Alternative under Surface Fuel Loading, and in the Summary of Alternatives. Additionally, the Fire Ecology, Fuels, and Air Quality Report provides maps of modeled post-treatment surface fuel loading of coarse woody debris greater than 3” diameter, duff, and litter (pgs. 74, 117, 156, 187, 218, and 247), along with descriptions of post-treatment surface fuel loading for each alternative. Modeled fire behavior was examined closely across the entire project area to determine areas where there is potential for active crown fire on slopes greater than 30%. These areas are identified and discussed in the Fire Ecology, Fuels, and Air Quality report under Restoration Units and Sub-Units for each alternative. There are no ‘fuel treatments’ proposed by the 4FRI, they are restoration treatments (differences are described in the response to paragraph 29 of the CBD comment letter). Treatment intensities were designed based on soil types, landscape patterns, land designations, and other considerations, including potential fire effects and behavior. Fire behavior is a primary objective in NEPA projects for which the primarily purpose is fuels reduction, and improved fire effects are a side-benefit of addressing fire behavior. Fire effects are a primary objective when restoration is the purpose of the project and, in ponderosa pine, decreased fire behavior is a side-benefit of restoration treatments. The analysis did include different treatments in different locations, but based it on restoration need and habitat, not strictly on potential fire behavior. See response to page 10 on fuel treatments vs. restoration treatments. ‘Fuels treatments’ are not a part of this project. The management of unplanned ignitions is out of the scope of this

of slopes that do not directly receive frontal wind (Finney 2001). Therefore, fuel treatments should be oriented in concert with prevailing spatial patterns of fire spread in the project area. Overlapping fuel treatments that reduce fuel continuity can fragment extreme fire effects into smaller patches if they disrupt heading fire behavior and increase the area burned by flanking and backing fires (Finney 2001). Slope aspects facing away from frontal or diurnal winds are a lesser treatment priority because backing fires are the most likely to exhibit mild intensity and effects. The Forest Service should analyze these factors and demonstrate that proposed treatment locations and intensities will meet the purpose and need. The analysis will be most helpful to the decision-maker and the public if it includes detailed study of action alternatives that propose different treatment locations and intensities to compare project effects on potential fire behavior and the environment. An additional approach to the strategic location of fuel treatments is to identify landscape features that are currently resistant to severe fire effects and use them as anchor points for a compartmentalized landscape fire management strategy. Such features may include natural openings, meadows, relatively open ridges, moist riparian areas, mature forest patches with shaded and cool microclimates and little or no history of past logging (e.g., Countryman 1955, Naficy et al. 2010), and areas where fuel treatments already have been completed. See DEIS at 677-82 (past actions in project area). Those features can support the strategic fire use for resource benefits, application of confinement and containment strategies as alternatives to full control of unplanned fires, and provide safe areas for workers to ignite prescribed fires for hazard reduction and ecological process restoration. The analysis should consider such factors. Finally, in our view, the Forest Service should prioritize fuel treatments at locations where relatively little resource investment may create fire resistant conditions in the shortest amount of time. Targeting initial work in this way will maximize the area treated with available funds and personnel, and provide the greatest opportunity to quickly reduce fuels and restore ecosystem function at larger spatial scales. It is not clear that the Forest Service has given its own research on this point requisite consideration in the DEIS.

project, but is covered in the forest plans for both the Coconino and Kaibab National Forests. Regarding strategic placement, the suggestion here seems to be that CBD would like the FS to analyze treatments placed and designed for the purpose of providing options for wildfire management operations and tactics. That would not address the purpose and need. Also see our previous responses on strategic placement. Prioritization of treatment implementation is done at the district level with prescribed fire as implementation of a project comes online. The sequencing of prescribed fires is dependent on many factors which cannot be predicted for weeks, or even days in advance. Implementation of mechanical treatments is not a NEPA decision and will be address at a district/forest level once the NEPA is complete.

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Cumulative effects Significant cumulative effects to the environment may result from the proposed action in combination with past, ongoing and foreseeable management activities (e.g., Elliot et al. 2010). The Forest Service is required to take a hard look at such impacts rather than merely list potential causes or mention that some risk may result from a catalogue of activities. See e.g., Neighbors of Cuddy Mountain v. U.S. Forest Service, 137 F.3d 1372, 1379-80 (9th Cir. 1998) ("To 'consider' cumulative effects, some quantified or detailed information is required […] General statements about 'possible' effects and 'some risk' to not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided"). Appendix F in the DEIS contains little information describing cumulative effects on various resources. The DEIS itself is not consistent across resources, and in many cases, it renders conclusions as opinion without supporting information. As noted above, the Forest Service advances an untenable rationale for excluding contracted 4FRI projects on other national forests from its analysis of significant cumulative effects. See DEIS at 697. It offers a similarly specious reason for excluding the Flagstaff Watershed Protection Project ("FWPP") from its cumulative effects statement: Flagstaff Watershed Protection Project: There are about 3,670 acres in the vicinity of Dry Lake Hills and Mormon Mountain that are likely to receive restoration actions in the foreseeable future (2013). The project is a partnership between the city of Flagstaff and Coconino NF. No purpose and need for action has been developed for the project; therefore, no specific activities have been proposed. At this time, this project has been eliminated from the cumulative effects reasonably foreseeable category. Id. In fact, the Forest Service developed a detailed purpose and need and proposed action for the FWPP, and released them for public scoping just one week after it published the notice of availability for this DEIS in the Federal Register.[24][24] According to the FWPP proposed action on page 2, "Overlap between the Four Forests Restoration Initiative (4FRI) and the FWPP area is present; some areas that are already being analyzed by 4FRI are being included in this planning effort to address additional treatment options (such as treatments on steep slopes), while other 4FRI areas will not be reanalyzed." On page 7, it proposes

(180-64) In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. Regarding consistency between resources, for past actions, the cumulative effects analysis must be consistent with 36 CFR 220.4(f). This regulation incorporates direction from 40 CFR 1508.7 and The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005). FSH 1909.15.3 provides specific direction on determining the spatial and temporal boundaries, two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial boundaries are defining the affected area for each resource indicator. Affected areas can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. "For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political"(FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose. The fire analysis defined past, present and reasonably foreseeable actions relevant to the fire resource on page 227 to page 249 of the fire ecology and air quality report. The

mechanical logging and prescribed fire on 8,810 acres, including within Mexican spotted owl PAC and nest core areas, and construction of 15.5 miles of new road, including within PAC. More, as described above, the FWPP proposed action includes forest plan amendments that are similar or identical to those proposed for the action alternatives in this DEIS. Livestock grazing may cause significant cumulative effects for several reasons. Grazing directly contributes to fire hazard by impairing soil productivity and altering plant composition, which indirectly contributes to delayed fire rotations, increased forest density, and reduced forage for herbivorous species (Arnold 1950, Belsky and Blumenthal 1997, Cooper 1960, Madany and West 1983, Mitchell and Freeman 1993, Rummell 1951). In addition, livestock grazing combined with proposed mechanical thinning, prescribed fire treatments, and foreseeable off-road motorized vehicle use (e.g., Kelley Motorized Trails Project) may spread exotic plants and reduce the competitive and reproductive capacities of native species. Once established, exotic species may displace natives, in part, because natives are not adapted to ungulate grazing in combination with fire (Mack and Thompson 1982, Melgoza et al. 1990, Belsky and Gelbard 2000). The DEIS lists many grazing allotments in the project area, but it fails to take a hard look at significant cumulative impacts that may result from the project together with continued grazing and other activities. Exotic plant spread is a potentially significant forest-wide cumulative impact of the proposed action. Treatments similar to the proposed action in northern Arizona left forest sites overrun with cheatgrass (Bromus tectorum) (McGlone et al. 2009). Although it is not extensive in the project area today, exotic grass invasion is foreseeable and has important long-term implications for native plant communities in fire-adapted ecosystems and wildlife. Melgoza and others (1990) studied cheatgrass soil resource acquisition after fire and noted its competitive success owing to its ability suppress the water uptake and productivity of native species for extended periods of time. They further showed that cheatgrass dominance is enhanced by its high tolerance to grazing. Its annual life-form coupled with the abilities to germinate readily over a wide range of moisture and temperature conditions, to quickly establish an

analysis did focus on past vegetation and fire actions that had affected the current condition. Only a summary of the fire cumulative effects analysis is displayed on page 164-165 of the DEIS. In the FEIS fire ecology and air quality report, those past actions that are relevant to the analysis can be found on pages 259-267. Historic conditions that have affected the current condition (including grazing) can be found on page 42 to 93. For example, page 42 states, In the latter part of the 19th century, unsustainable practices in fire management, grazing, and logging began to change spatial and temporal patterns on the landscape, as well as the structure and composition of landscape components. These practices combined to shift ecosystems within the project area out of their Natural Range of Variability, so that ecological functions are now impaired across the landscape of northern Arizona (Leopold, 1924, Heinlein et al. 2005, Covington and Moore 1994, Fulé et al. 1997b, Covington et al. 2001). See the botany report for the cumulative effects analysis related to non-native invasive species. In response to comments on the DEIS, additional analysis was conducted for cheatgrass. The botany report states (page 230-231), McGlone and others (2009) prepared two articles on cheatgrass invasion after restoration treatments at Mount Trumbull, AZ. In one article, published in Ecological Restoration titled Cheatgrass Encroachment on a Ponderosa Pine Forest Ecological Restoration Project in Northern Arizona, the cheatgrass invasion was documented in 2003, several years after the initial treatment in some units of the study. McGlone and his co-authors cite weather as a contributing factor to cheatgrass invasion. The areas he cited in his study experienced a severe drought in 2002, displacing most plants including cheatgrass. Then the area received above average precipitation in September 2002. Since cheatgrass is a winter annual, the cycle was conducive to cheatgrass germination. During that time, significant increases were seen in cheatgrass cover in all treatments including the control (no treatment area). A similar weather cycle was observed in many parts of the western US during that time, including the Flagstaff area. We believe this is the article the commenter is referring to in his comments. The authors discussed the issue of cheatgrass invasion on the same study area. In that publication, native plant richness and cover increased after treatments but the cover was not sufficient to exclude the cheatgrass invasion and again

extensive root system, and to grow early in the spring contribute to its successful colonization. In addition, Melgoza and others (1990) showed that cheatgrass successfully competes with the native species that survive fire, despite these plants being well-established adult individuals able to reach deeper levels in the soil. This competitive ability of cheatgrass contributes to its dominance when lands experience synergistic disturbances from grazing, mechanical treatments, and fire. Plan amendments All of the action alternatives would amend standards and guidelines of the forest plans. The Center commented in scoping that the amendments are "significant," within the meaning of the NFMA, and therefore require observance of appropriate and more extensive NFMA procedures. The DEIS fails to support a finding that the plan amendments are "nonsignificant" because the public cannot use the information contained in it to determine the acres affected or their relationship to other anticipated uses under the plans. For example, the Forest Service does not disclose the method or analysis it used to determine that the amendment regarding canopy cover in ponderosa pine forest would affect only 18 percent of goshawk habitat in the Coconino National Forest and 20 percent of habitat in the Kaibab National Forest. The scope of proposed treatments in goshawk habitat under the proposed amendments are far more extensive than disclosed in the DEIS. The proposed amendments are "significant" because they may bring about "Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area." FSM 1926.52 (Jan. 31, 2006). This is particularly evident in light of facts, discussed above, that the Forest Service is concurrently advancing identical plan amendments in every pending action on the Coconino National Forest with a similar purpose and need. The Forest Service should account for cumulative effects of its efforts to unravel current management direction and follow the procedures required for developing and approving forest plans. In conclusion, the Center views the project as potentially beneficial if it observes the science-based recommendations provided above, but we have significant questions regarding many aspects of the analysis, including its segmentation of the overall 4FRI program, its failure to

cites drought as a contributing factor. While we cannot control the weather and other environmental conditions, we will incorporate mitigation measures such as not burning during severely dry periods which is one of McGlone' s recommendations. Occurrences of cheatgrass within the Four Forest Restoration Initiative boundary are not well documented. Areas likely to contain cheatgrass infestations include severely disturbed areas such as recent wildfires. The Four Forest Restoration Initiative will restore the structure and process of the ponderosa pine forest throughout northern Arizona. The Forest Service recognizes the significance of cheatgrass invasions and their effects to ecosystem functions and processes, especially the effects on fire frequency and areal extent. The forests completed the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (FEIS) in 2005, which provides the guidance for treatment noxious or invasive weeds on the Coconino, Kaibab and Prescott National Forests. We plan to survey and treat noxious or invasive weeds prior to the implementation of management activities in the units to be treated. Adaptive management and additional treatments will be used if needed to address the effects of noxious or invasive weeds. See appendix C of the DEIS (page 569), design criteria B 15 and B16 for features addressing the survey, treatment and prevention of noxious or invasive weeds. See our previous responses on the significance of plan amendments, reasonable range of alternatives and cumulative effects. However, regarding species viability as a result of the alternatives that include forest plan amendments, in the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and ongoing projects by the FS and identified each project by National Forest and Ranger District.

disclose cumulative effects, its lack of a reasonable range of alternatives, and its amendment of forest plans, which may undermine species viability.

Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 – 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 – 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 – 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321). The above actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects analysis for MSO was revised. The FEIS wildlife report states, “Because of the size of the 4FRI analysis area and the large portion of the western UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects” (Wildlife Report, page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers.comm. 2006). Wildlife habitat in the form of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with

		symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, table 153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page400 to page 412 of the wildlife report. Similar to MSO, the goshawk cumulative effects analysis has been revised since the DEIS was published, see the FEIS, chapter 3.
Lininger, Jay	This attachment does not contain comments; it is the Implementation Guide, Region 3,Northern Goshawk Standards and Guidelines, February 23, 2007	
Lininger, Jay	This attachement has no comments; it is literature cited in their comment letter (#180). It contains two documents. One is a Congressional Research Service Report for Congress titled "Timber Harvesting and Forest Fires" August, 2000. The second is the Flagstaff Watershed Protection Project scoping letter, map and Proposed Action, April 2013.	(203-1) See responses to comment letter 180 as it relates to cumulative effects and the inclusion of the Flagstaff Watershed Protection Project (FWPP). In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF).
Lininger, Jay	Attachment #5 contains two articles that were cited in the original comment letter. The first article is "Ecological Restoration of Southwestern Ponderosa Pine Ecosystems: A Broad Perspective" 2002; the second is "Process-centred restoration in a fire-adapted ponderosa pine forest" 2006.	(205-1) These articles were reviewed. The project is supported with Allen et al. 2002. The comment from page 2 paragraphs 5 was responded to by the following, "Prescribed fire treatments are an integral part of the overall vegetation management design. The project is designed to establish forest structure, composition and pattern so that fire can be safely re-introduced at the landscape scale". Reconstruction of the density and location of large trees is far more reliable than of small-diameter stems and seedlings that decompose rapidly…" We agree with this statement. The ephemeral quality of seedlings and saplings is attributable to the disturbance regime

(including fire), and leaves few tangible signs. Old trees and large trees were more likely to leave evidence as to what their historic role/s were in forest structure, as well as a record of some components of climate and disturbance in the form of tree rings an fire scars. “Utilize existing forest structure. – Restoration efforts should incorporate and build upon valuable existing forest structures such as large trees and groups of trees of any size with interlocking crowns…Since evidence of long-term stability of precise tree locations is lacking, the selection of “leave” trees and tree clusters in restoration treatments can be based on the contemporary spatial distribution of trees, rather than pre-1900 tree positions. Historical forest structure conditions can be restored more quickly by maximizing use of existing forest structure. Leaving some relatively dense within-stand patches of trees need not compromise efforts to reduce landscape-scale crown fire risk” The proposed treatments in 4FRI do exactly this, and are described in more detail in the implementation guide (Appendix D in the DEIS). The existing condition of the project area includes areas where trees have grown large by CBD definitions (>16” dbh), though they may be decades or even centuries younger than other trees nearby – which may actually have a smaller dbh. The proposed treatments distinguish between ‘old’ trees and ‘large’ trees, as described in this example from the Implementation Plan on page 614 of the Implementation Plan (Appendix D in the DEIS):“Manage for the sustainability of individual/isolated old ponderosa pine trees as defined in the old tree implementation strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to 18 inches dbh that do not meet the old tee definition and whose crowns are outside the old tree crown drip line: (1) within a 50-foot radius that are in the intermediate or suppressed crown positions and (2) that would eliminate direct crown competition on two of the four sides of the old tree. No trees larger than 24-inch dbh would be cut.” Additionally, the Forest Service has incorporated the Old Growth Protection and Large Tree Retention Strategy (OGPLTRS), developed by the Stakeholders, into the Implementation Plan included in the DEIS. That describes in detail the conditions under which trees greater than 16” could be cut if necessary to meet treatment objectives. “Retain trees of significant size or age.—Large and old trees, especially those

established before ecosystem disruption by Euro-American settlement, are rare, important, and difficult to replace. Their size and structural complexity provide critical wildlife habitat by contributing crown cover, influencing understory vegetation patterns, and providing future snags. Ecological restoration should protect the largest and oldest trees from cutting and crown fires, focusing treatments on excess numbers of small young trees. Given widespread agreement on this point, it is generally advisable to retain ponderosa trees larger than 41 cm (16 inches) dbh and all trees with old-growth morphology regardless of size (i.e., yellow bark, large drooping limbs, twisted trunks, flattened tops). Despite the heterogeneity of forest site and stand conditions in the Southwest, cutting of larger trees will seldom be ecologically warranted as ''restoration'' treatments at this time due to their relative scarcity. Following this guideline would significantly reduce hazards of stand-replacing fires in most cases and also favor the development of future old-growth forest conditions (Moir and Dieterich 1988, Harrington and Sackett 1992). Public concern about forest manipulation would also be reduced by ensuring that ''large'' trees are not being targeted." In Southwestern ponderosa pine ecosystems this means reducing tree density and ladder fuels along with associated crown fire risk, protecting large trees, restoring surface fires, and increasing herbaceous ground cover and overall biodiversity levels…Existing forest structures, such as tree groups and large trees, should not be removed simply to recreate historical tree spatial patterns…"We are distinguishing between large trees and old trees and, as written in the DEIS and the Implementation Plan, there are only two conditions under which an old tree may be cut (safety or the expectation of greater ecological disturbance if the tree is not cut). Conditions under which trees >16" dbh) MAY be cut if needed to meet treatment objectives are specified as described in the OGPLTRS, and would be evaluated on a site by site basis. Finally, refer to CBD's comment letter, page 11, paragraph 29 which states "it meets the purpose and need by actively managing hazardous fuels and forest structure, even to the extent that it specifically allows for removal of large trees in limited circumstances, as distinct from a broad "diameter cap." While this does not give specifics for when/which trees should be cut, it clearly states that sometimes large trees may need to be cut. The project is supported with Falk 2006.

		The comment from page 2 paragraphs 5 was responded to by the following, “Prescribed fire treatments are an integral part of the overall vegetation management design. The project is designed to establish forest structure, composition and pattern so that fire can be safely re-introduced at the landscape scale”.
Lininger, Jay	This attachment contains the following literature cited in a comment letter: "Effects of Livestock Grrazing on Stand Dynamics and Soils in Upland Forests of the Interior west" (1997); "Regional analysis of the impacts of climate change on cheatgrass invasion shows potenetial risk and opportunity" (2008); Effects of of Invasive AlienPlants on Fire Regimes" (2004); Cheatgrass Encroachment on a Ponderosa Pine Forest Ecological Restoration Project in Northern Arizona" (2009).	(208-1) See responses to letter 180 for topics including impacts to soils and water. See responses that address non-native invasives, including cheatgrass. For the most detailed response for non-native invasive species, please see our complete response to the Ecological Restoration Institute letter, letter 165 and the botany report response to comments appendix.
Lininger, Jay	Attachment to a comment letter submitted by J. Lininger on behalf of CBD containing literature cited. It contains: "Extended megadroughts in the southwestern United States during Pleistocene interglacials" (2011); "National Level Assessment of Water Quality Impairments Related to Forest Roads and Their Prevention by Best Management Practices" (2008).	(2011-2) Please see our previous responses to attachment (Cara) 206 and letter 180 for potential water quality impairments related to forest roads and best management practices. Please see our previous response to attachment 6 (Cara 206) that addresses Fawcett et al. 2011. (212-2) The attachment references Brown and Franklin 2004. There is no question that large trees are an important component of restoring ponderosa pine forest, but there are other factors that are considered as well Brown et al. (2004) list four factors that line up well with the treatments proposed by the 4FRI. These four factors are: 1. Manage surface fuels to limit the flame length of a wildland fire that might enter the stand. This is generally done by removing fuel though prescribed fire, pile burning, or mechanical removal. This reduces the potential energy of a wildland fire and makes it more difficult for a fire to jump into the canopy (Scott & Reinhardt 2001). 2. Make it more difficult for canopy torching to occur by increasing the height to flammable crown fuels. This can be accomplished though pruning, prescribed fire that scorches the lower crown, ore removal of small trees. 3. Decrease crown density by thinning overstory trees, making tree-to-tree crowning less probable. This will not be necessary on all sites and will be effective only if linked to the application of the first two principles (Perry et al. 2004). 4. Keep larger trees of fire-resistant species (Hummel & Agee 2003). The treatments proposed by the 4FRI do all of these. ‘Large tree structure’ will not be ‘removed’, though some large
Lininger, Jay	Attachment to a comment letter submitted by J. Lininger on behalf of CBD that contains literature cited. It contains the following: "Forest Restoration and Fire: Principles in the Context of Place" (2004); "Beyond Smoke and Mirros: a Synthesis of Fire Policy and Science" (2003);"Recommendations for Integrating Restoration Ecology and Conservation Biology in Ponderosa Pine Forests of the Southwestern United States" (2006); Forest Structure and Fire Susceptibility in Volcanic Landscapes of the Eastern High Cascades, Oregon" (2004); "How resilient are southwestern ponderosa pine forests after crown fires?" (2005).	

trees may be removed under conditions specified in the adaptation of the Large Tree Retention Strategy as adapted into the DEIS. Additionally, Brown et al. (2004) state: “Mid-seral ponderosa pine stands (roughly 60 – 100 years old) represent a secondary priority for restoration treatments. These stands are often developing old-growth characteristics but are usually too dense. Treatments to help maintain this trend can increase the probability that old-growth habitats are restored more quickly than they would be otherwise. Variable-density thinning mimics the clumped distribution and associated processes found in pre-1850 stands (Franklin et al. 1997, Harrod et al. 1999). There is no ‘proposed logging of large and old trees’. Large trees may be cut under specific circumstances as described above. Old trees will rarely, if ever, be cut, they are not proposed for logging. The comment attachment referenced Noss et al. 2006. This study produced recommendations for integrating principles and practices of restoration ecology and conservation biology for the restoration of ponderosa pine systems. Recommendations made are well aligned with the actions proposed by the 4FRI, and the manner in which the analysis has been conducted. Noss et al. (2006) state: Available evidence indicates that planning should occur on a regional scale in order to integrate and reconcile multiple objectives (e.g., biodiversity conservation and restoration of ecosystem health). It is also evident that a variety of restoration treatments should be used to spread the risk of failure of any one approach and that a ‘‘one-size-fits-all’’ approach to forest restoration is inappropriate. Such an active adaptive management approach is sensible, but only if pursued rigorously with a valid experimental design and monitoring plan, and including the comparative testing of multiple hypotheses. Reducing road density across the landscape and protecting the remaining old trees from logging, unnatural stand-replacing fire, and uncharacteristic levels of insect and disease attack are perhaps the most needed conservation measures. Such measures will increase the likelihood that biodiversity will persist into a restored state, when natural fire regimes and informed management complete the integration of restoration and conservation (end quote). The attachment referenced Perry et al. 2004. The description in the comment about cutting small trees and pruning branches of
large trees is described as ‘thinning from below’, and

has few applications to restoration. If this was done at a landscape scale, there would be large areas of closed-canopy forest as these areas continued to mature, and the canopies continued to close up. Pollett and Omi (2002) determined that removing small diameter trees may be beneficial for reducing crown fire hazard. This research was specifically done in reference to fuels treatments and, though the principle is clearly sound in regards to a method of reducing the immediate potential for crown fire initiation, it is not a prescription for how to implement restoration of ponderosa pine ecosystems. Perry et al. (2004) discuss canopy bulk density (CBD) in terms of ponderosa pine in Washington state being encroached by various species of fir, and the potential uses of multi-story CBD measurements. While they do appear to have potential, they are not yet usable for modeling fire behavior/effects. From pages 30 and 31 of the comment letter: Omi and Martinson (2002) measured the effect of fuel treatments on fire severity in highly stratified forest sites in the western United States and reported a strong correlation of crown base height with "stand damage" by fire. Importantly, crown bulk density did not strongly correlate with observed fire effects: [H]eight to live crown, the variable that determines crown fire initiation rather than propagation, had the strongest correlation to fire severity in the areas we sampled...[W]e also found the more common stand descriptors of stand density and basal area to be important factors. But especially crucial are variables that determine tree resistance to fire damage, such as diameter and height. Thus, "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management. Omi and Martinson (2002: 22) (end quote). Omi and Martinson found that cbd did correlate with observed fire effects, specifically crown scorch, a significant indicator of tree mortality. Omi and Martinson (2002) stated: Agee (1996) has suggested a crown bulk density threshold of 0.1 kg/ha as a general determinant for active crowning under extreme fire conditions. It is notable that all of our treated areas averaged at or below this threshold, while all untreated areas averaged above…However, crown bulk density was not the fuel hazard variable most strongly correlated to fire severity at our study sites; in fact it was significantly correlated only to crown volume scorch. Instead, height to live crown, the variable that determines

Lininger, Jay	Attachment to the comment letter submitted by J. Lininger on behalf CBD which contains the literature cited. It includes: "Review of Ecological Effects on Terresreial and Aquatic Communities" (2000); "Forest Roads: A Synthesis of Scientific Information" (2001).	crown fire initiation rather than propagation (Van Wagner 1977), had the strongest correlation to fire severity in the areas we sampled (end quote). CBD interpreted Perry et al. 2004 data to indicate that Perry et al. did not agree that removing large or dominant trees could reduce the resistance to control of control in extreme weather. However, the following is from page 924 of Perry et al. 2004: Our study was not designed to address landscape-level fire risk. However, for a hypothetical landscape with a range of stand structures and crown bulk densities similar to our plots, protecting the entire landscape against such extreme conditions would require levels of thinning ranging from relatively light to relatively heavy, where heavy thinning implies removing all trees up to 60 cm dbh (end quote). They continue on by explaining that cutting large, old trees could exacerbate future risk…however, the 4FRI is not proposing to cut old trees. The 4FRI places high value on conserving large trees and retains large trees as a focus. As an added post treatment benefit, the large trees will be more sustainable and less susceptible to loss from density related mortality and other threats such as insects, disease and uncharacteristically severe wildfire. Graham et al. (2004), and Hunter et al. (2007) describe the Fire Triangle, but break up the fuels portion. The Fire Triangle is basic fire science that describes fire behavior as being determined by fuels, weather, and topography. It is a commonly understood theme, for fire/fuels management, that the fuels 'leg' of the triangle is the only one we can actively manage. See our previous response as well. Additionally, the 4FRI is about more than moderating potential fire behavior. It is about creating/recreating structure in forests that often have none or little, and setting the forests back on a trajectory towards conditions closer to historic conditions that will increase the resilience and restore the pattern, composition, and structure of the forests.The attachment referenced Savage and Mast 2005. This is a very relevant paper. It is cited in the Fire Ecology/Air Quality Report six times, as well as in the DEIS. (210-1) This attachment included two documents regarding the effects of roads to wildlife. This attachment is in support of individual comments in the CDB comment letters but do not present any comments on their own. Roads are addressed in the wildlife specialist report on pages 29, 35, 51, 89-91, 144, 152, 153, 154, 155,156, 158,

Lininger, Jay	Attachment to the comment letter submitted by J. Lininger on behalf of CBD. This attachment contains no comments; it is literature cited in main comment letter. Literture cited is: Designs of Regular Landscape Fuel Treatment Patterns for Modifying Fire Growth and Behavior (2001); "Future climate affects management strategies for maintaining forest restoration treatments"(2010);"Reducing Crown Fire Hazard in Fire-Adapted Forests of New Mexico" (2003); "Ponderosa pine mortality following fire in northern Arizona" (2003); "Characterizing fuels in the 21st Century" (2001); "Effects of Crown Scorch on Ponderosa Pine Resistance to Bark Beetles in Northern Arizona" (2003).	163, 165, 169, 180-181, 187, 190, 191,198-200, 201-202, 203-205, 206-207, 209, 238, 239, 240, 241, 270, 272, 273, 274, 301, 302, 303, 304, 322, 326, 329-330, 344, 352-356, 358-359, 361, 362, 364, 365, 373, 375, 376, 377, 378, 380, 381, 382, 384, 386, 387, 388, 389, 390, 391, 393, 394, 395, 396, 397, 398-399, 406, 409, 415, 455, 560, 567, 575, 583, 593, 622, 708-720, 725, 728-730, 734, 736, 737, 740, 742-747, and appendix 14. The FEIS will include a discussion of roads and habitat fragmentation in the biological assessment (wildlife report, appendix 2).Also see our response to letter 180 as it relates to the impacts of roads on terrestrial and aquatic species. (209-1) The attachment included a reference to Diggins et al. 2010. The project is supported with Diggins et al. 2010 by the following, "Ecological restoration and fuel treatments aim to maintain carbon stocks in a frequent-fire-adapted forest by making it more resistant to fire, drought and disease, typically by reducing the density of small-diameter trees (Covington et al. 1997; Millar et al. 2007). Our analysis shows that there are several feasible management strategies to maintain these desirable characteristics in the future" (Diggins et al 2010). The comment that this paper was cites was responded to by the following, "Some minor levels of mortality of all sized trees are a normal occurrence in natural forest ecosystems, and characteristic levels of large tree mortality are desired to produce key wildlife habitat elements (snags, down logs). Treatment mitigations to limit and avoid damage to desired large leave trees have been incorporated into the project design. Implementation of this project will produce forest conditions that are far more resilient than the current condition, and therefore it is highly probable that large trees will experience greater longevity as a result of this project. Under the current forest conditions, large trees are at high risk of accelerated mortality due to insects, disease and uncharacteristically severe fire". The attachment included Wallin et al. 2003. This science is taken into consideration for the analysis. The paper also recognizes "that pheromones attracted insects to the tree, but host physiological condition or other factors ultimately determined host colonization" (Wallin et al 2003). Wallin et al 2003 study supports the project to increase forest resilience to bark beetles. The comment to which this was cites was responded by the following, "Some minor levels of mortality of all sized trees are a normal occurrence in natural

forest ecosystems, and characteristic levels of large tree mortality are desired to produce key wildlife habitat elements (snags, down logs). Treatment mitigations to limit and avoid damage to desired large leave trees have been incorporated into the project design. Implementation of this project will produce forest conditions that are far more resilient than the current condition, and therefore it is highly probable that large trees will experience greater longevity as a result of this project. Under the current forest conditions, large trees are at high risk of accelerated mortality due to insects, disease and uncharacteristically severe fire". The attachment referenced Finney, M.A. 2001. We have updated the FEIS and the Fire Ecology/Specialists' report to clarify the difference between 'fuel' treatments and 'restoration' treatments. This paper by Finney is one of the foundations of our current state of the knowledge for fuels treatments and fire modeling. The main premise of which is generally on the mind of modelers and managers when considering how fire might move across a landscape. Nonetheless, the 4FRI treatments were developed primarily with restoration in mind, not moderating fire behavior. There is, however, a significant overlap in the fire behavior objectives for fuel management and restoration in ponderosa pine systems in the southwest. In both cases, the objectives result in reduced potential for fire behavior, with the majority of fire behavior reverting to surface fire. Finney (2001) assumes a post treatment fuel model that will slow the spread rate of a fire. This may or may not be the case in the proposed treatments by the 4FRI. From the Fire Ecology/Air Quality specialist report: "…Decreasing the horizontal and vertical continuity of canopy fuels (direct effect) would allow sunlight to reach the surface, increasing surface temperatures, and decreasing dead fuel moisture content at the surface. This, combined with increased surface winds with fewer trees blocking the wind, could increase surface fire intensity, flame length, and rate of spread even if surface fuels were the same before and after thinning (Omi and Martinson 2004, Scott 2003)…."Finney's 2001 analysis was conducted specifically with an objective of reducing fire behavior and hazard, not restoration. This study specifically addressed fuel management: "The goal of fuel management is to preemptively modify wildfire behavior through changes to the fuel complex. Fuel management has received increasing interest for mitigating fuel hazards (U.S. Department of the

Interior and Department of Agriculture 1996, U.S. General Accounting Office 1999), some of which were created by nearly a century of fire suppression on millions of acres in the western United States (Arno and Brown 1991). Fuel treatments are intended to help limit wildland fire sizes and severity by directly mitigating fire behavior and indirectly by facilitating suppression. “Prescribed fire would be used along with thinning with the expectation that it would raise canopy base heights, address surface fuels, and thin seedlings and some small saplings as indicated in the Finney 2001 study, along with multiple other functions of fire that are discussed in the Fire Ecology Report. The attachment referenced Fieldler and Keegan, 2003. The ‘comprehensive’ treatment mentioned consisted of “trees are marked for leave in the sizes, numbers, species, and juxtaposition that will go furthest toward restoring a sustainable structure, given existing stand conditions. Most of the 40 to 50 ft2/acre target reserve basal area is comprised of larger trees, although some trees are marked for leave throughout the diameter distribution, if available.” This supports the proposed action where the selection of trees to be cut is not based solely on their diameter, but on the best sustainable structure. Statistically, there was no difference immediately post treatment (though the restoration treatment appeared to do slightly better that the dbh cap), and the dbh cap appeared to-do slightly better over 30 years (though statistically there was no difference). The restoration treatment could set the forest on a trajectory for management within its historic fire regime (frequent, low severity), while the diameter limit would leave less structural diversity. The attachment referenced Keyes and O'Hara 2002. We agree that stand structure plays a critical role in crown fire susceptibility. If creating crown fire-resistant stands in the short term was the primary objective, and restoration and the long-term trajectory of the forest was not, it might be appropriate to use only ‘low thinning’ and pruning. As illustrated by modeling in the Silvicultural and Fire Ecology/Air Quality reports, the proposed treatments would reduce the potential for high severity fire, while setting the forest on a trajectory towards resilience and health. Keyes and O’Hara state:”A silvicultural approach to reducing crown fire hazard may not be compatible with all forest objectives. For example, habitat management for a wildlife species that requires a complex, multilayered canopy will not be compatible with a

low-thinning regime to reduce ladder fuels. However, the silvicultural practices described here – pruning and thinning – are consistent with stand management objectives that emphasize stand growth, wood quality, and individual tree vigor for pest and disease resistance." The 4FRI is not taking an approach focused on' reducing crown fire hazard', but, rather, an approach that is based on the more site specific potential, based on current condition, special designations (habitat, proximity to infrastructure, soils, watershed/slope, etc.). 3) The former two factors' mentioned are (1) surface fuel density and arrangement and; (2) canopy base height. As illustrated by modeling in the Silvicultural and Fire Ecology/Air Quality reports, the proposed treatments would reduce the potential for high severity fire, while setting the forest on a trajectory towards resilience and health. We will be adding this as a reference to the Fire Ecology/Air Quality specialists report to support the need for maintenance burning. Thank you for sending tithe attachment referenced McHugh and Kolb 2003. We recognize that there are risks for using fire of any kind and, as stated in Appendix C of the DEIS, and for each alternative in the Fire Ecology/Air Quality report: Where site specific mitigation is needed to limit damage or mortality to large or old trees, it is best accomplished by reducing accumulations of fuels within the dripline and in the immediate vicinity of the trees. These fuels may include litter, duff, accumulations of woody fuels, ladder fuels, or any fuel that could produce sufficient heat to lethally damage a tree. This can be accomplished manually, mechanically, or though fire treatments. Potential measures include implementing prescription parameters, ignition techniques, raking, wetting, leaf blowing, thinning, or otherwise mitigating fire impacts to the degree necessary to meet burn objectives. Throughout the life of this project, it is likely that some large and/or old trees would be damaged or killed by prescribed fire. It would not be possible to mitigate every large and/or old tree over 30,000 to 40,000 acres of prescribed fire units each year." The attachment referenced Sandberg et al. 2001. We have a response to the following paragraph: The bulk density (weight within a given volume) of ground fuels (e.g., grasses, shrubs, litter, duff, and down woody material) influences frontal surface fire behavior (heat output and spread rate) more than fuel loading (weight per unit area) (Agee 1996, Sandberg et al. 2001). This paragraph

Lininger, Jay	Attachment to the comment letter #180 submitted by J. Lininger on behalf of CBD containing literature cited. It includes: "Warming and Earlier Spring Increase Western US forest Wildfire Activity" (2006); Effect of Thinning and Prescribed Burnaings on Wildfire Severity in Ponderosa Pine Forests" (date unknown); "Interactive effects of historical logging and fire exclusion on ponderosa pine forest structure in the northern Rockies" (2010);"Effects of Forest Biomass Use on Watershed Processes in the Western United States" (2010);"Effects of Fuels Treatments on Wildfire Severity" (2002); "Cumulative watershed Effects of Fuel Management in the Western United States" (2010); "Silvicultural and reserve impacts on potential fire behavior and forest conservation: Twenty-five years of experience from Sierra Nevada mixed conifer forests" (2005); "Use of a Derministic Fire Growth Model for Test Fuel Treatments" (1996).	is a factual statement of some of the physics that apply to fire. We see this as supportive to the methods of analysis that we have used. (207-2) Gorte 2000 was included in the attachment but it was not cited in the comment letter (Cara 180). However, we reviewed and found nothing in this report that seems relevant to the 4FRI analysis. It is a statistical exercise that has no discussion of cause and effect backed by facts or data. Westerling et al. 2006 was included in the attachment. This literature was cited in the fire ecology and air quality specialist report. Pollet and Omi 2006 were included in the attachment. We addressed in response to comments (letter 180). From the response to comments: The description in the comment about cutting small trees and pruning branches of large trees is described as thinning from below', and has few applications to restoration. If this was done at a landscape scale, there would be large areas of closed-canopy forest as these areas continued to mature, and the canopies continued to close up. Pollett and Omi (2002) determined that removing small diameter trees may be beneficial for reducing crown fire hazard. This research was specifically done in reference to fuels treatments and, though the principle is clearly sound, it is not a prescription for how to implement restoration of ponderosa pine ecosystems (end quote). From the response to comments: Furthermore, these cited studies (Pollet and Omi2002) deal specifically with fuels reduction while the objectives of the 4FRI are to restore composition, structure and functions that support ecological functions across the landscape. Prescribed fire will be used along with thinning with the expectation that it would raise canopy base heights, address surface fuels, and thin seedlings and some small saplings as indicated in the Finney 2001 study, along with multiple other functions of fire that are discussed in the Fire Ecology Report (end quote). We agree that managing fuel loading and structure are critical components of restoration. The components listed (surface fuel structure, canopy base height, topography, and weather), are the components in the fire behavior triangle: fuel, topography, weather. This is basic fire behavior science, and is included in the analysis and in the modeling that was used. If large trees are removed, it would be under conditions described in the incorporation of the Large Tree Retention Strategy which was written by the Stakeholder group. We agree with this statement and, although the 4FRI does not provide any

direction for managing unplanned ignitions, treatments are expected to improve the decision space and flexibility for line officers deciding how to manage wildfires. This reference is also cited in specialists' report. Naficy et al. 2010 was included in the attachment. From the response to comments: Naficy et al. (2010) describe a difference in forest structure between areas that were logged and had fire exclusion, and areas that were logged prior to 1960 and had fire exclusion. Their data show that areas that were logged and had fire "…have higher average stand density, greater homogeneity, more standing dead trees, and a greater abundance of fire-intolerant trees than the unlogged, fire-excluded stand…propose that ponderosa pine forests with these distinct management histories likely require a distinct restoration approach (end quote). However, this research was done in the northern Rockies, and the response could be different in southwestern ponderosa pine and the associated climate. The 4FRI proposed treatments were developed stand by stand, to take into consideration the conditions of each stand, as well as soil type, landscape patterns, and special designations (such as MSO habitat) (end quote).The statement, "Logging slash produces higher flame lengths and more intense surface fires that can increase the probability of crown fire initiation compared to fuels that pre-exist logging operations (Dodge 1972, Naficy et al. 2010, Stephens and Moghaddas 2005). Pg. 30" was made as part of a description of how CBD interprets the results of implementation of Alternative D. We generally agree with them, and the assertion that slash would increase flame lengths/fireline intensity is real". The statement, "Such features may include natural openings, meadows, relatively open ridges, moist riparian areas, mature forest patches with shaded and cool microclimates and little or no history of past logging (e.g., Countryman 1055, Naficy et al. 2010), and areas where fuel treatments already have been completed. Pg. 32 The context under which this statement is used here is out of the scope of the 4FRI (compartmentalized landscape fire management). Omi and Martinson 2002 were included in the attachment. Omi and Martinson (2002) found that diameter and height are critical variables associated with tree resistance to fire damage, and that' "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management'. They also

concluded that 'crown fire propagation is dependent on the abundance and horizontal continuity of canopy fuels…' The proposed treatments in 4FRI are intended to restore, or put on a trajectory towards restoration of, historic forest structure, including groups and interspaces. The interspaces would be expected to provide sufficient discontinuity in canopy fuels so that, if a group of trees experienced crown fire, it would drop to the ground before the fire reached another group of trees. Omi and Martinson found that cbd did correlate with observed fire effects, specifically crown scorch, a significant indicator of tree mortality. Omi and Martinson (2002) stated: "Agee (1996) has suggested a crown bulk density threshold of 0.1 kg/ha as a general determinant for active crowning under extreme fire conditions. It is notable that all of our treated areas averaged at or below this threshold, while all untreated areas averaged above…However, crown bulk density was not the fuel hazard variable most strongly correlated to fire severity at our study sites; in fact it was significantly correlated only to crown volume scorch. Instead, height to live crown, the variable that determines crown fire initiation rather than propagation (Van Wagner 1977), had the strongest correlation to fire severity in the areas we sampled. Like Pollet and Omi (2002), we also found the more common stand descriptors of stand density and basal area to be important factors. But especially crucial are variables that determine tree resistance to fire damage, such as diameter and height. Thus, "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management." Stephens and Moghaddas 2005 were included in the attachment. This paper refers exclusively to mixed conifer in the Sierra Nevada. There are probably some similarities in some features of fuel loading, there are sufficient data from ponderosa pine systems, that it is not necessary to try to sort out which features are probably the same and which are different. Van Wagtendonk 1996 was included in the attachment. Van Wagtendonk's conclusions apply to post-treatment conditions but, since this study focused on mixed conifer, there would be some differences. There are sufficient data available for ponderosa pine fuels to complete the analysis without referencing this paper and trying to sort out what would apply to southwestern ponderosa pine and what would be more specific to mixed conifer.

Lininger, Jay	Sept 2011 CBD scoping comments March 2011 CBD scoping comments May 18, 2012 News release Sample RFP for construction	(201-1) Comments from CBD are filed in the project record. See the 2012 scoping report for responses to all comments received on the informal scoping process from 2011 to 2012. (206-1) Peter J. Fawcett et al. 2011 Extended megadroughts in the southwestern United States during Pleistocene interglacials was not referenced in comment letter. The project is supported with Fawcett et al. 2011 by recommending to create resilience for Extended mega-droughts in the southwestern United States. A second attachment: Endicott, D. 2008. National Level Assessment of Water Quality Impairments Related to Forest Roads and Their Prevention by Best Management Practices. Final report to U.S. Environmental Protection Agency, Contract No. EP-C-05-066, Task Order 002, was reviewed. Appendix C, pages 580 through 590 (SW10, SW11, SW12, SW14, SW16, SW17, SW18, SW20, SW22, SW24, SW30, and SW31) provide specific design features, BMPs, and mitigation measures to protect soils and water quality during and after temporary road construction, decommissioning, and obliteration and permanent road maintenance activities.
Lininger, Jay	This is not a comment; it is literature cited in the original comment letter (#180).	(196-6) The DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site-specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up
Lininger, Jay	The DEIS is expected to be the only analysis of significant environmental impacts that may result from proposed forest treatments on 587,923 acres over a 10-to-20 year period on two national forests. However, it is so broad in scope that it cannot provide information necessary for the public to understand even basic facts about how treatments will affect forest structure (e.g., tree densities, size class distributions, regeneration openings, interspaces, canopy cover). The lack of site-specific analysis in the DEIS limits the public's ability to raise issues about environmental impacts and precludes those issues from being addressed through meaningful comparison of action alternatives by the decision-maker. The alternatives differ only by the acreage to be affected by a similar menu of treatments, and they contain identical forest plan amendments, which precludes comparison of effects to threatened and sensitive species. The Forest Service intends the 4FRI to cover 2.4-million acres on four national forests. Given its enormous and unprecedented scale, the 4FRI should be analyzed in a programmatic environmental impact statement with a decision to be followed by tiered, sitespecific analysis of planned treatments at smaller scales.	

The 4FRI is a comprehensive management proposal warranting analysis in a programmatic EIS, after which site-specific environmental impacts of implementation plans should be studied and disclosed in tiered analysis following National Environmental Policy Act ("NEPA") procedures. In our view, the Forest Service should have prepared one comprehensive EIS for the entire 4FRI program rather than segmenting its analysis into component parts.

from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601). The site-specificity of the analysis was tested by the 4FRI stakeholder group on May 12, 2013. In response to comments on the DEIS, the stakeholders wrote, "The Stakeholder Group is concerned that in such a large

analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue" (4FRI Stakeholder, 2013 Cara Letter 155). Most examples of using site-specific data to inform the environmental consequences in the DEIS can be found in the each resource report in the methodology sections. Examples in the DEIS include fire which discloses fire behavior at specific locations of concern, at the subunits, the restoration unit, landscape scales and specific locations (such as Pulliam Airport, Kachina Village, Perkins Telescope, etc. (DEIS, p. 150). How individual MSO PAC treatments were identified for treatment in appendix B pp. 443-444 of the DEIS. Regarding the type of analysis, completing a programmatic EIS is outside the scope of this analysis. Although the objective for 4FRI is to complete landscape restoration across four forests, this is not equivalent to having a connected action. As of November 2014, there is no analysis underway in this EIS that renders decisions that would be needed by the next analysis in order to move forward. It is unknown whether there may be one analysis or several. Even addressing the next analysis (analyses?) in terms of cumulative effects remains too speculative as there are no reasonably foreseeable (quantifiable) proposed activities that can be evaluated in terms of overlap in time and space to the Coconino NF and Kaibab NF analysis. Decisions such as the location of the next analysis or analyses (including analysis boundaries) and the existing and desired conditions for that landscape have not been determined. Please provide specific examples of where Coconino NF and Kaibab NF proposals, currently under analysis, will: (i) automatically trigger other actions which may require environmental impact statement, (ii) cannot or will not proceed unless other actions have been taken previously or simultaneously, or (iii) they are interdependent parts of a larger action and depend on the larger action

for it justification (40 CFR § 1508.25(a) (1) (i)-(iii)). If the goal is truly to affect landscape restoration as quickly as practicable, we do not understand how taking 1 to 2 years (or more) to conduct a programmatic EIS that would then require numerous, multiple analyses moves towards this objective. The issue of moving forward with a programmatic EIS versus as project specific EIS was discussed with the Council of Environmental Quality as early as 2009 when the landscape restoration proposal was being prepared as a CFLR proposal. Stakeholder representatives were on the conference call. The notes from this call are available or can be found in the project record. This EIS is specific to the portions of the Coconino and Kaibab National Forests boundaries within the project boundaries, and as such, are analyzed based on the respective Forest Plan guidance.

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We have a serious question if the agency implemented NEPA procedures before awarding the "Phase 1" contract to Pioneer Forest Products. See 40 C.F.R. § 1500.1(b) ("NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken"); 1501.2 ("Agencies shall integrate the NEPA process with other planning at the earliest possible time"); 1502.2(g) ("Environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made"); 1502.5 (the EIS "shall be prepared early enough so that it can serve practically as an important contribution to the decision-making process and will not be used to rationalize or justify decisions already made"). No prior NEPA analysis or decision for the component 4FRI projects named in the Pioneer contract states their connection to, similarity with, or cumulative effects of the overall 4FRI program. As a result, significant cumulative effects to the environment remain undisclosed.

(196-7) The Phase 1 4FRI Stewardship contract is not a NEPA decision and will utilize existing signed NEPA decisions to implement the contract. Each of the NEPA decision is designed to meet the intent of their respective Forest Plans, not a comprehensive restoration strategy. The phase 1 4FRI contract is a mechanism to implement individual NEPA decisions that in turn, implement the respective Forest Plan.

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The DEIS identifies five "significant issues," each of which are suitable for comparison of action alternatives to inform the decision-maker and the public about the range of significant environmental impacts that may result from the project. However, it proposes three action alternatives that are virtually identical except for the acreage proposed to be affected by a common suite of treatments and forest plan amendments. For example, no alternative would implement the

(196-8) The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). "The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues

	Coconino and Kaibab Forest Plans as they currently exist. This is a matter of concern to us because the plan amendments would jettison many standards and guidelines that are designed to ensure continued viability of threatened and sensitive species and old growth forests (USDA 1996). Lacking an action alternative that would implement the project without amending those standards and guidelines, the DEIS presents no basis for the public to understand the significance of impacts that may result from the amendments themselves.	related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed "(36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14).The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. The purpose of alternative E is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. With alternative E, this increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study.
Lininger,	Significant cumulative effects to the environment may result from	(196-9) In response to comments on the DEIS and changes that have

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the proposed action in combination with past, ongoing and foreseeable management activities within and around the project area. The Forest Service is required to take a hard look at such impacts rather than merely list potential causes or mention that some risk may result from a catalogue of activities. Appendix F in the DEIS contains little information describing cumulative effects on various resources. The DEIS itself is not consistent across resources, and in many cases, it renders conclusions as opinion without supporting information. This is most evident in the analysis of vegetation. Livestock grazing may cause significant cumulative effects for several reasons. First, grazing directly contributes to fire hazard by impairing soil productivity and altering plant composition, which indirectly contributes to delayed fire rotations, increased forest density, and reduced forage for herbivorous species. In addition, livestock grazing combined with proposed mechanical thinning and prescribed fire treatments may spread exotic plants and reduce the competitive and reproductive capacities of native species. Once established, exotic species may displace natives, in part, because natives are not adapted to ungulate grazing in combination with fire. The DEIS lists many grazing allotments in the project area, but it fails to take a hard look at significant cumulative impacts that may result from the project together with continued grazing.

occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. We disagree that it the actions and events that are included in appendix F are limited to vegetation. There are many vegetation and fire actions and events listed because they affect vegetation structure, pattern and function. However, examples of other actions and/or disturbances include insect and disease occurrences, powerline infrastructure, grazing allotments, and recreation-related activities (see appendix F in the DEIS and FEIS). Regarding fire cumulative effects, the fire analysis defined past, present and reasonably foreseeable actions relevant to the fire resource on page 227 to page 249 of the fire ecology and air quality report. The analysis did focus on past vegetation and fire actions that had affected the current condition. Only a summary of the fire cumulative effects analysis is displayed on page 164-165 of the DEIS. In the FEIS fire ecology and air quality report, those past actions that are relevant to the analysis can be found on pages 259-267. Historic conditions that have affected the current condition (including grazing) can be found on page 42 to 93. For example, page 42states, In the latter part of the 19th century, unsustainable practices in fire management, grazing, and logging began to change spatial and temporal patterns on the landscape, as well as the structure and composition of landscape components. These practices combined to shift ecosystems within the project area out of their Natural Range of Variability, so that ecological functions are now impaired across the landscape of northern Arizona (Leopold, 1924, Heinlein et al. 2005, Covington and Moore 1994, Fulé et al. 1997b, Covington et al. 2001). Regarding invasive species see the botany report for the cumulative effects analysis related to non-native

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Alternative C proposes mechanical treatments on up to 45,000 acres annually, but it proposes management-ignited prescribed fire on only up to 40,000 acres each year. Alternative D would implement mechanical logging treatments on more than double the acreage where it proposes to ignite prescribed fires. Where mechanical treatments would occur in the absence of prescribed fire, the Forest Service proposes to manage activity created slash fuel with machine piling, lop-and-scattering and pile burning. Those actions are not likely to reduce the elevated fire hazard that results from creation of activity fuels because mechanical logging generates large quantities of slash fuels by relocating tree stems, branches and needles from the overstory canopy to the ground surface. Logging slash produces higher flame lengths and more intense surface fires that can increase the probability of crown fire initiation compared to fuels that pre-exist logging operations. According to the Congressional Research Service, Timber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these "fine fuels" on the forest floor increases the rate of spread of wildfires. Thus, one might expect acres burned to be positively correlated with timber harvest volume.[1][1] Mechanical treatments in all action alternatives will increase the density and volume of fine fuels on the ground surface, which will increase fire resistance-to-control and make wildfires more dangerous and severe where activity fuels are not effectively managed. The Forest Service is required to disclose potentially significant effects on public health and safety, including fire control efforts. It should take a hard look at post-logging fuel profiles at a sitescale, particularly where prescribed fire may not be used, rather than generalizing them across the project area. More, the analysis should disclose how much slash would remain on the ground after logging is completed and take a hard look at the effectiveness of different activity fuel treatments. The intensity of wildland fire behavior and the severity of its physical and biological effects depend, in part, on fuel properties and their spatial arrangement. Fuel bed structure is a key determinant of fire

invasive species. In response to comments on the DEIS, additional analysis was conducted for cheatgrass (botany report, pp. 230-231). (196-10) Changes in fuel loading were analyzed by alternative and the effects to potential fire behavior were disclosed (DEIS pages 23 – 24; 160 – 161, and in the Fire Ecology/Air Quality Specialists' report in Methodology, Metrics, Canopy Characteristics and Surface Fuel Loading; Under each Alternative under Surface Fuel Loading, and in the Summary of Alternatives). The assumption is that the KNF and COF average about 20,000 acres of wildfire a year, and prescribed fire would be used to supplement acres burned in wildfire in order to average 60,000 acres of fire a year. Alternative D does not provide the benefits of fire that Alternatives B, C, or E do, and potential emissions are greater in Alternative D than in B, C, or E. Alternative E was developed in response to comments on the DEIS. The Fire Ecology, Fuels, and Air Quality Report also provides maps of modeled post-treatment surface fuel loading of coarse woody debris greater than 3" diameter, duff, and litter (pgs. 74, 117, 156, 187, 218, and 247), along with descriptions of post-treatment surface fuel loading for each alternative. Modeled fire behavior was examined closely across the entire project area to determine areas where there is potential for active crown fire on slopes greater than 30%. These areas are identified and discussed in the Fire Ecology, Fuels, and Air Quality report under Restoration Units and Sub-Units for each alternative. Treatment intensities were designed based on soil types, landscape patterns, land designations, and other considerations, including potential fire effects and behavior. Fire behavior is a primary objective in NEPA projects for which the primarily purpose is fuels reduction, and improved fire effects are a side-benefit of addressing fire behavior. Fire effects are a primary objective when restoration is the purpose of the project and, in ponderosa pine, decreased fire behavior is a side-benefit of restoration treatments. The analysis did include different treatments in different locations, but based it on restoration need and habitat, not strictly on potential fire behavior. See response to page 10 on fuel treatments vs. restoration treatments. 'Fuels treatments' are not a part of this project. The management of unplanned ignitions is out of the scope of this project, but is covered in the forest plans for both the Coconino and Kaibab National Forests. Regarding strategic placement, the suggestion here

ignition and spread potential and a central consideration in developing an effective management strategy. In turn, potential surface fireline intensity dictates the likelihood of tree crown ignition and torching behavior. To accurately assess fuel treatment effects on the likelihood of crown fire initiation and spread, it is necessary to consider (1) surface fuel density and arrangement, (2) canopy base height, (3) local topography, and (4) weather patterns. The former two factors can be actively managed in ponderosa pine and dry mixed conifer forest to significantly decrease the likelihood of crown fire initiation and spread without resort to large tree removal in most cases. The analysis must be specific to each site proposed for treatment and then scaled up to the landscape level for consideration of cumulative effects, illustrating the need for tiered NEPA analysis, as discussed above. The direction of fire spread is an important consideration because fire interacts with weather, topography and vegetation to "back" and "flank" around certain conditions or "head" through others as it spreads. Steep slopes can facilitate wind-driven convection currents that drive radiant heat upward and bring flames nearer to adjacent, unburned vegetation, thus pre-heating fuels and amplifying fire intensity as it spreads upslope. As a result, severe fire effects often are observed to concentrate at upper slope positions and on ridges, whereas such effects are relatively rare on the lee side of slopes that do not directly receive frontal wind. Therefore, fuel treatments should be oriented in concert with prevailing spatial patterns of fire spread in the project area. Overlapping fuel treatments that reduce fuel continuity can fragment extreme fire effects into smaller patches if they disrupt heading fire behavior and increase the area burned by flanking and backing fires. Slope aspects facing away from frontal or diurnal winds are a lesser treatment priority because backing fires are the most likely to exhibit mild intensity and effects. The Forest Service should analyze these factors and demonstrate that proposed treatment locations and intensities will meet the purpose and need. The analysis will be most helpful to the decision-maker and the public if it includes detailed study and development of action alternatives that propose different treatment locations and intensities to compare project effects on potential fire behavior and

seems to be that CBD would like the FS to analyze treatments placed and designed for the purpose of providing options for wildfire management operations and tactics. That would not address the purpose and need. Also see our previous responses on strategic placement. Prioritization of treatment implementation is done at the district level with prescribed fire as implementation of a project comes online. The sequencing ofprescribed fires is dependent on many factors which cannot be predicted for weeks, or even days in advance. Implementation of mechanical treatments is not a NEPA decision and will be address at a district/forest level once the NEPA is complete.

the environment. Finally, in our view, the Forest Service should prioritize fuel treatments at locations where relatively little resource investment may create fire resistant conditions in the shortest amount of time. Targeting initial work in this way will maximize the area treated with available funds and personnel, and provide the greatest opportunity to quickly reduce fuels and restore ecosystem function at larger spatial scales. This is particularly important in light of uncertainty about the ability of Pioneer Forest Products to execute the "Phase 1" contract that the Forest Service already has awarded to it for 4FRI implementation. The contractor still has no investors, nor does it have a clear business plan or demonstrated expertise in executing forest treatments at the scale and intensity proposed for this project.

Most old growth forests that historically existed in the project area and throughout the Southwestern Region were eliminated by logging. Landscape-scale assessment of ecological conditions and wood supply in northern Arizona ponderosa pine forests identified a "zone of agreement" in which forest management is likely to proceed with little or no controversy. We encouraged the Forest Service in scoping to study, develop and describe action alternatives that maximize retention of existing large trees (>16-inches diameter) to promote old growth recovery. The Forest Service is in possession of the collaborative Old Growth Protection and Large Tree Retention Strategy ("Strategy") developed by public stakeholders forimplementation in the 4FRI. The Strategy is an agreement-based product developed inrecognition that translation of such agreement can greatly enhance the likelihood ofsuccessful implementation and reduce the risk of social conflict. See DEIS at 37 ("If the [Strategy] is not incorporated [into 4FRI], the current social support for landscape-scale restoration may be withdrawn"). Given the enormous commitment of stakeholder time and energy to collaborative development of the Strategy, and its clear importance to the Forest Service's ability to implement the project, it is reasonable to study, develop and describe in detail (rather than mention and dismiss) a stand-alone action alternative based on the entire Strategy as it was designed and presented to the Forest Service by the stakeholders.[2][2] The DEIS eliminates from detailed

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(196-11) The DEIS, pages 56-57, provides rationale on why it was not reasonable to incorporate the original LTRS as written into the preferred alternative (alternative C). We agree the modified large tree implementation plan includes modifications (hence the title). Table 15 on page 60 provides a comparison between the original large tree retention strategy and the modified large tree implementation plan (included in alternative C in the DEIS and in alternative C and E in the FEIS). For riparian resources please note that page 647, paragraph 2, last sentence states "However, it is likely to be a very rare circumstance that conifer trees of any size would need to be removed from forested riparian zones." On pages 57-61 the DEIS describes an alternative considered but eliminated that would have limited mechanical treatment to 16-inch d.b.h. as a means to preserve large trees. The reintroduction of an endangered species and the management of game species are both outside the scope of the analysis of the proposed vegetation treatment. The authorization of livestock grazing is also outside the scope of the proposed vegetation manipulation. Livestock grazing is addressed in cumulative effects if relevant to a resource. However, aspen treatments would only occur if there is an ability to fence the treated stand afterwards. Fencing would be of an adequate design to preclude grazing of suckers by elk or livestock (DEIS pages vi, vii, 41, 47, 62, 63, 74, 81, 88, 95, 142, 288, 306, 606, 640, and 691; wildlife report pages 93, 153, 155, 156, 158, 238, 270, 435, 447, 572, and 581. Since the large and old trees are used interchangeably, we will

consideration an action alternative that would "utilize the original large tree retention strategy." DEIS at 48. Instead, it includes only "key components" of it in an "implementation plan." That plan selectively interprets and significantly revises the Strategy. In particular, the Forest Service changes the meaning of its precautionary "exception categories" for large tree removal into affirmative commands to mine large trees from all of nine discrete ecological settings in the project area. See DEIS at 708-709 ("Exception categories include the ["Wildland Urban Interface" – WUI] and the following ecological sites where young tree encroachment is inhibiting ecological function: seeps and springs, riparian areas, wet meadows, grasslands, aspen forest and woodland, pineoak forest, within-stand openings, and heavily stocked stands (with a high basal area) generated by a preponderance of large, young trees. Elsewhere, those trees would be retained…"). Moreover, added an exception to remove trees larger than 16-inches diameter to create "regeneration openings." The DEIS states that this was done to remedy a purported "violation" of the forest plans and to allow the Forest Service to create openings were they conform to "desired conditions." However, each of the action alternatives includes several plan amendments that are necessary to remedy potential forest plan violations that they may create. It is arbitrary for the agency to screen the collaborative Strategy from the action alternatives considered in detail based on this rationale. It is reasonable to study, develop and describe an alternative based on the collaborative Strategy, even if it also requires plan amendments, to facilitate informed comparison of environmental impacts including a hard look at how well the alternatives meet desired conditions and the purpose and need. The Forest Service's unilateral modifications of the Strategy ignore the express intent of the 4FRI stakeholders that old growth forest should be retained in all instances and large trees younger than 150 years generally should be retained in most instances except where clearly defined circumstances, ecological objectives and selection criteria apply at sitespecific scales. The stakeholders plainly did not intend to apply a blanket exemption to the Strategy in all of the contexts listed by the Forest Service. The DEIS contains none of the exception

also do so. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". The DEIS included specific treatment designs that manage for the sustainability of large trees in

criteria proposed by the stakeholders, and replaces them with "desired conditions" that allow unlimited discretion to remove old and large trees. See DEIS at 644 ("Exceptions would be made for threats to human health and safety, and those rare circumstances where the removal of an old tree is necessary in order to prevent additional habitat degradation."); 646 ("There may be additional areas and/or circumstances where large post-settlement trees need to be removed in order to achieve restoration objectives."). As a result, the Forest Service has divided public stakeholders and undermined collaboration with predictable results that may include jeopardy to the project. A more specific and highly significant example of differences between the collaborative Strategy and the DEIS implementation plan for large trees occurs in riparian areas. On page 11, the collaborative Strategy contains this selection criterion: "Where large trees are growing (rooted) within a riparian area and compromising available soil moisture or light that support that area's unique biophysical conditions." In contrast, the DEIS implementation plan for large trees lacks an equivalent limitation, but instead states, "If treatment occurs [in riparian areas], an equivalent number of large replacement trees remain where there is evidence that pre-settlement trees have grown in similar root and crown proximity to a particular seep or spring in the past." DEIS at 647. Vegetation patterns in and around riparian areas vary temporally and spatially, based on flooding history, water availability and soil composition (Hupp, 1988, Stromberg et al. 1993, Hupp and Osterkamp 1996, Poff 2002). Creating a one-for-one tree arrangement in riparian areas, representing the spatial arrangement of the previous century, is not necessarily the most appropriate way to protect soil stability and riparian forest health. The Forest Service should recognize the stakeholder agreement to conservatively treat riparian areas and leave large trees in place where possible. Also, please note that there is a typo in the DEIS statement cited above: a "seep" or "spring" is not necessarily a riparian zone. Riparian areas are characterized by moving water and/or floodplains, and not all seeps and springs have riparian zones. The wording should be changed to indicate that this part of the document is discussing riparian areas. Another specific example of difference between the collaborative Strategy and the

appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

DEIS implementation plan for large trees relates to treatments in aspen forest and woodland habitats. The Strategy states on page 17, “Other factors contributing to gradual aspen decline over the past 140 years include reduced regeneration from browsing by livestock and introduced and native wild ungulates in the absence of natural predators like wolves [].” However, the Forest Service unilaterally modified this statement in the DEIS: “Other factors contributing to gradual aspen decline over the past 140 years include reduced regeneration from browsing ungulates [].” DEIS at 650. In fact, the DEIS omits all mention of “natural predators like wolves” as being beneficial to aspen, and omits mention of livestock as detrimental to aspen. This is problematic because wolf reintroductions are among the only cases that resulted in improved aspen recruitment and survival (Ripple and Beschta 2011, Ripple and Beschta 2007). When large predators, particularly wolves, were reintroduced to Yellowstone National Park, USA, and Banff National Park, Canada, the wolves brought elk populations to manageable levels, and as a result of the decrease in grazing pressure, aspen populations near wolves rebounded (Hebblewhite et al. 2005, Ripple and Beschta 2007). What is the Forest Service's rationale for removing those words from its background information on Aspen Forest & Woodland? The Forest Service should return the statement to its original, scientifically defensible, and stakeholder-constructed form.

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Old growth forests are the preferred habitat of many threatened and sensitive wildlife species and provide a host of ecological services including watershed function, clean water, soil retention, and storage of greenhouse gasses. As noted above, most of the former old growth forests throughout the ponderosa pine and mixed conifer formations in northern Arizona were destroyed by logging and continue to be degraded by livestock grazing and fire suppression. The 1996 Plan Amendment for the Southwestern Region (USDA 1996) includes mandatory standards and guidelines for old growth habitat management. Each national forest, including the Coconino and Kaibab, must allocate no less than 20 percent of each forested “ecosystem management area” to old growth habitat. In order to properly determine old growth habitat, the Forest Service must refer to a specific table included in the plans that sets forth

(196-12) The DEIS discloses that most sites do not currently meet (forest plan) old growth definitions (DEIS page 15). The allocation direction in the forest plan directs the project to "strive to create or sustain as much old growth compositional, structural, and functional flow as possible over time at multiple-area scales…and seek to develop or retain old-growth function on at least 20 percent of the naturally forested area by forest type in any landscape” (USDA 1987, USDA 1988), see page 15 of the DEIS." The DEIS (page 15) describes the areas included in the old growth allocation. What is included in the ponderosa pine allocation goes beyond old and mature VSS classifications. As noted above in a previous response, we included areas closest to meeting old growth conditions. The Silviculture Specialist Report (page 46) states that the areas allocated “are managed to move toward those conditions to meet structural attributes over time”. The old growth

detailed minimum numeric criteria for various forest types, including the size, age and number of live and dead trees, down trees and canopy cover. Forested sites must meet or exceed these numeric structural attributes in order to be considered old growth habitat. In addition, the amended forest plans require the agency to analyze old growth habitat at multiple scales: (1) the ecosystem management area; (2) one scale above the ecosystem management area; and (3) one scale below the ecosystem management area. The amount of old growth that can be provided and maintained must be evaluated at the ecosystem management level and be based on forest type, site capability and disturbance regimes. The Forest Service also must analyze and disclose how many acres within the ecosystem management area currently meet the minimum numeric criteria for old growth habitat set forth in the forest plans; assess potential impacts to old growth habitat at the required scales; allocate no less than 20 percent of each management area to old growth as depicted in the forest plans; and must not log any of the remaining large trees within the project area until it meets these mandatory requirements. The DEIS does not demonstrate compliance with the forest plan standards and guidelines for old growth forest described above. It defines "restoration subunits," which range in area from 4,000 to 109,000 acres, as the equivalent of "ecosystem management areas," and states that 194,804 acres (38 percent) of the 512,178 acres of ponderosa pine forest in the project area are the "closest" to meeting old growth conditions. On the basis of this information, the analysis concludes, "Currently, all restoration units meet or exceed the 20 percent minimum forest plan requirement." However, it also states, "Most sites currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans" (emph. added). The public cannot independently determine from information provided in the DEIS that the project meets forest plan standards and guidelines for old growth at each of the prescribed spatial scales. In particular, the DEIS: (1) Fails to analyze old growth at all of the required spatial scales. (2) Fails to disclose the actual extent of old growth. (3) Fails to disclose the method by which the agency determined that "allocated" stands are "closest" to forest plan standards. (4) Fails to disclose treatment effects to existing old

standards for the Coconino NF states, "Until the forest plan is revised, allocate no less than 20 percent of each forested ecosystem management area to old-growth as depicted in the table below. In the long term, manage old-growth in patterns that provide for a flow of functions and interactions at multiple scales across the landscape through time. Allocations will consist of landscape percentages meeting old-growth conditions and not specific acres" The old growth guideline for the Coconino NF states, "All analyses should be at multiple scales—one scale above and one scale below the ecosystem management areas" (USDA FS 1987, page 70-1). The DEIS disclosed the scales of analysis (and rationale) on page 15. To be consistent with the Coconino NF forest plan, scales of analysis based on existing divisions of the landscape were developed specifically for the project. The smallest scale is represented at the stand level with stands averaging less than 100 acres in size. The Ecosystem Management Area (EMA) is the restoration sub-unit. Sub-units range in size from 4,000 to 109,000 acres. The scale above the EMA is the restoration unit, which ranges in size from 46,000 to 335,000 acres. Direction specific to the Coconino NF Management Area 3, Ponderosa Pine Mixed Conifer Less Than 40% Slope, Old Growth (Coconino NF Forest Plan, replacement page 127) includes direction written as a standard: "Stands managed for old-growth are 100 to 300 acres in size". There is no corresponding direction in the revised Kaibab NF plan (USDA FS 2014). For the Coconino NF, forest plan direction for goshawk, old growth, wildlife hiding and thermal cover, and timber resource management, references conducting evaluations at the ecosystem management areas (EMAs) scale. However, beyond this forest-wide direction, which is a result of the 1996 amendment of 11 forest plans, there is no additional direction in the forest plan regarding the use of EMAs. For example, there is no relationship or crosswalk between the EMA to plan management areas. Across the forest, vegetation projects that are required to stratify vegetation and habitat at a scale above and below the EMA have directly linked the EMA to a 10,000-acre (10K) block analysis. The 10K blocks have been based on stand boundaries. For those projects that exceeded 10,000 acres, the scale above the EMA was often a conglomeration of 10,000-acre units (Cote, personal communication with Flagstaff RD 2011).Using a 10,000-acre scale would have been

growth. At no point does the DEIS discuss the condition of existing old growth habitat or effects of the action alternatives this rare and important habitat. The 4FRI stakeholders collectively commented to the Forest Service on this DEIS, "What is unknown is to what degree there will be 'safety and human health' or 'habitat degradation issue' situations as part of project implementation (new road construction, landings and skid trails), and to what extent project activities might affect old tree mortality (prescribe burning mostly, and some harvest activity)." More, "It is difficult to tell from information provided in the DEIS, what level of impact the almost tripling of road miles might have on the preservation of old trees." Because old growth is deficient in the project area, the Forest Service is hard pressedto demonstrate that removing more will maintain the viability of old growth dependent species. The agency cannot assert without supporting analysis or data that logging additional large and old trees, as proposed in this project, will improve habitat for old growth dependent species. It must disclose scientific uncertainty regarding its assumption that proposed logging of large and old trees will meet the purpose and need to restore the ecological condition of ponderosa pine forest and improve old growth habitat.

meaningless for a project of this size. The 10K block was used as a surrogate as a means to get to a landscape scale of analysis. A 10K analysis for this project would be too small to use for assessing impacts at the landscape and ecosystem scale. A key assumption in using the 10K block was if objectives were being met at the 10K, objectives were being met at the larger scale. There was a need to use scales which allowed for meaningful analysis from the small scale to the landscape scale. Coconino NF plan language specifically says blocks may be larger or smaller if approved by the forest supervisor. The Coconino NF supervisor may sign a project record document demonstrating the need, and rationale for, deviating from the 10K analysis (Coconino NF Forest Plan, page 70). Since the DEIS was published, the Kaibab NF revised its forest plan (USDA FS 2014). Desired conditions (paraphrased) at the fine scale include having tree groups of various age classes and size classes, having crowns of trees within the mid-aged to old groups (Kaibab NF forest plan, p. 17). The (paraphrased) desired condition at the landscape scale (over 10,000 acres) is to have old growth occur throughout the landscape as a component of uneven-aged management with the location of old growth shifting on the landscape as a result of succession and disturbance. Old growth components include old trees, snags, coarse woody debris, and structural diversity (Kaibab NF forest plan page 18). The FEIS reflects the new plan direction. The vegetation analysis in the FEIS (chapter 3) describes how the alternatives move towards desired conditions. The implementation plan (appendix D in both the DEIS and FEIS) describes in detail how treatments would be designed to protect old trees. The silviculture report clarifies that the Kaibab Forest plan does not specify a percentage of required old growth habitats. However, to be consistent across forest boundaries the old growth on the Kaibab NF will be analyzed against the 20% allocated habitat (FEIS Silviculture Report, page 68).

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All of the action alternatives in the DEIS include amendments to standards and guidelines of the forest plans for management of sensitive northern goshawk (Accipiter gentilis) in ponderosa pine forest. They appear to advance a new Forest Service approach to managing goshawk habitat that was criticized by the Arizona Game and Fish Department as incompatible with the viability of sensitive

(196-13) The Arizona Game and Fish Department (a cooperating agency for this project) has refuted statements regarding their position and concerns for this project (see project record documentation from Arizona Game and Fish Department). The Arizona Game and Fish Department expressed concerns in 2007 regarding the Jack Smith-Schultz Project. They have been supporters of the restoration strategy,

species (USDA 2007). In particular, the state agency commented to the Forest Service that changing the spatial scale at which canopy cover is measured to the tree group level "has the potential to significantly reduce the amount of forest cover within treated areas."[3][3] Further, the amendments would change the method of counting forest openings that the Forest Service set forth in the Vegetation Structural Stage ("VSS") classifications of its existing plans. According to the new interpretation, "interspaces" located in between small tree groups are not to be included in VSS 1,[4][4] which may result in a significantly more open forest structure than anticipated in prior environmental analysis (USDA 1995, 2006). The 4FRI stakeholders commented to the Forest Service on this DEIS, "It is also unclear in the document at what scale the USFS will be balancing the distribution of structural stages, as they relate to regeneration openings, interspaces and tree groups. We know from the DEIS that percentages have been assigned at small spatial scale. What is unclear is how these will be distributed across the mid-scale (100 to 1,000 acres)." They recommend adding assurances in the analysis and decision that clearly state old trees will not be cut to create regeneration openings. Further, the stakeholders suggest including visually graphic examples of regeneration openings applied at the fine (<100 acres), mid-scale (100- 1,000 acres) and restoration unit scale. We echo their comments here. The DEIS states that the plan amendments "would not impose requirements on [] future management of goshawk habitat," and they are "specific to this analysis." However, that statement clearly is misleading to public understanding because the agency is simultaneously advancing similar or identical amendments to the Coconino Forest Plan in concurrent projects including: · The Clints Well Decision Notice changed standards and guidelines affecting 7,695 acres of goshawk habitat. · The Wing Mountain Decision Notice changed standards and guidelines affecting 8,922 acres of goshawk habitat. · The Mahan-Landmark proposed action would amend plan direction for about 25,000 acres of goshawk habitat. · The Flagstaff Watershed Protection Project would amend the plan on another 3,280 acres of goshawk habitat. The Forest Service is required to take a hard look at the cumulative effect of these similar plan amendments on the

the desired conditions described for the 4FRI Project, and co-authored the bridge habitat section (Appendix G). The Arizona Game and Fish Department did not provide comments related to canopy closure in their comment letter for the DEIS. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of

viability of sensitive species and their prey.

that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. Also see our previous responses on post-treatment landscape openness. The DEIS (pages 201-216) and the wildlife specialist report (pages 358-405) has taken a hard look at these effect of the plan amendments for projects that fall within the cumulative effects analysis areas for sensitive species except for the goshawk. The FEIS has included this into the cumulative effects section for goshawk in both the wildlife specialist report (begins on page 429 and in the FEIS (page 293-303). In the FEIS, the cumulative effect section for the

Lininger, Jay	The project area will impact critical habitat of threatened Mexican spotted owl (Strix occidentalis lucida). Management activities that may affect federally protected species require consultation with the U.S. Fish and Wildlife Service ("FWS") to ensure no-jeopardy to the continued existence of listed species or adversely modify critical habitat, and to secure an exemption for "take," which is otherwise prohibited by the Endangered Species Act. In our view, the project may cause incidental take of Mexican spotted owl because it would directly impact nest core areas and Protected Activity Centers ("PACs") out of compliance with existing standards and guidelines in the forest plans (USDA 1996), which are designed to maintain owl viability and avoid jeopardy to the species or adverse modification of its critical habitat. The Forest Service should candidly disclose implications of its proposed change of course.	goshawk still supports the conclusion that the plan amendments for the 4FRI project are still non-significant (in terms of effects). Regarding forest plan amendments in a procedural manner, for goshawk, the (FEIS) amendments on the Coconino NF in alternatives B-D authorized managing acres for an open reference condition (up to 90 percent open) and clarified how (and where) canopy cover would be measured. This amendment clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest... In alternative E (no amendments) there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Contrary to comments that suggest this project is driving forest-wide management direction, we found the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). (196-14) See pages 188-324 in the wildlife report for the analysis of effects to Mexican spotted owls. Formal consultation was conducted for this project. The biological assessment for the project was submitted to the FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing key habitat components for MSO and their prey. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project "may affect and is likely to adversely affect MSOs and their habitat, including critical habitat", (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS found the preferred alternative will not jeopardize the continued

existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat (USDI FWS 2014, page 33). Regarding forest plan compliance, (previous) Biological Opinion and incidental take statements are no longer in effect for either forest and were replaced for the Kaibab and Coconino NF in March 2012 with a new Biological Opinions for the 1987 and 1988 Forest Plans. In addition, the Kaibab NF is now under a new Biological Opinion signed September 10, 2013 for the Revised Forest Plan. Monitoring for the project effects is based on the monitoring requirements in the 4FRI Biological Opinion (see appendix E).

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All of the action alternatives would amend forest plan standards and guidelines for Mexican spotted owl by: (1) allowing mechanical removal of trees up to 18-inches diameter on 7,353 acres in 18 PACs; (2) allowing management-ignited fire in 56 PAC "core areas" (~5,600 acres); (3) removing limits on PAC treatments to 10 percent increments in each recovery unit; (4) deleting language that requires selection of an equal number of untreated PACs as controls; (5) repealing the requirement to monitor owl populations and habitat; (6) allowing designation of less than 10 percent of Restricted Habitat for management as "target" or "threshold" habitat (i.e., nesting and roosting habitat); and (7) permitting retention of as little as 110 ft^2/acre basal area on 6,321 acres of Restricted Habitat. The need for the plan amendments is a significant issue for analysis due to the controversial and uncertain efficacy of proposed treatments in promoting the conservation and recovery of Mexican spotted owl (USDI 1995, 2012). The Forest Service is required by NEPA to fully disclose controversy and uncertainty regarding effects of the project to Mexican spotted owl and its critical habitat. Its analysis must take a hard look at explicit cautions in the revised Recovery Plan for Mexican spotted owl (USDI 2012) regarding proposed activities and offer a good-faith and reasoned response to them. Furthermore, the Forest Service must disclose in detail the "MSO PAC field reviews, data evaluation, and vegetation simulation modeling" it used to determine that there is a need to mechanically thin trees larger than 9-inches diameter in PACs.

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Remarkably, the Forest Service states that these plan amendments are "a specific, onetime variance" for management of Mexican

(196-15) Only one action alternative would allow cutting trees up to 18" dbh in PACs (DEIS pages v, vi, viii, ix, 62, 63, 81, 88, 95; wildlife report pages 154-159, 211-306); only one action alternative would allow burning in core areas (DEIS pages v, vi, viii, ix, 62, 63, 81, 88, 95; wildlife report pages 154-159, 211-306); rigorous monitoring will be cooperatively developed with the FWS once they review the BA and develop the BO (pp viii, ix, 40, 41, 42, 64, 81, 88, 89, 117, 118, 119, 143, 144, 308, 315, 439, 440, 443, 444, 455, 456, 457, 458, 484, 496, 497, 498, 500, 502, 518, 520, 536, 549, 562, 563, 564), the amendment to designate less than 10% target or threshold habitat is justified by distribution of owls, owls habitat, and the fact that within the treatment area more than 11% of restricted habitat will be designated as target or threshold habitat, and only 1 action alternative used the 110 BA later adopted in the revised recovery plan (DEIS pages vi,). The proposed activities and the subsequent monitoring will provide important information in regards to management in MSO habitat, which is part of the reason the FWS has supported these actions. The MSO PAC field reviews can be found in appendix 2 of the wildlife specialist report.

(196-16) In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative

spotted owl habitat, and "the language proposed does not apply to any other forest project." DEIS at 500. That statement clearly is misleading to public understanding because the agency simultaneously proposes to amend the Coconino Forest Plan in concurrent projects that will cumulatively unravel existing management direction for Mexican spotted owl and the basis of prior FWS biological opinions. For example, the proposed action for the "Mahan-Landmark Project" contains a plan amendment that would allow "timber harvest" in PACs, including removal of trees up to 16-inches diameter, contrary to existing standards and guidelines. In addition, the agency proposed in the "Flagstaff Watershed Protection Project" to: (1) repeal the plan's 9-inch diameter limit on mechanical thinning in PACs; (2) delete timing restrictions on forest treatments in PACs; (3) allow logging and burning in nest core areas; (4) remove the 24-inch diameter limit on timber harvest in Restricted Habitat; and (5) excuse itself from the requirement to monitor Mexican spotted owl populations and habitat. The various forest plan amendments in all of these projects are similar or identical, yet the Forest Service states – in duplicative language – that each is "specific," and does "not apply to any other forest project." The Forest Service is required to take a hard look at the cumulative effect of these concurrent and controversial plan amendments on threatened species and critical habitat.

E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan. The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. One of the amendments is specific to MSO. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. No amendment (including the MSO amendment) alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the

Lininger, Jay	The monitoring element of plan amendments affecting Mexican spotted owl is controversial because the Forest Service admitted in its October 2008 Annual Report to FWS that it lacked funding and personnel to conduct required monitoring of owl habitat and populations to ensure that its actions would not jeopardize the continued existence of the species or adversely modify critical habitat. [5][5] Given its failure to monitor Mexican spotted owl under binding terms and conditions of an incidental take statement, we have specific questions about the monitoring plan for this project that should be addressed in the EIS, namely: (1) criteria for selection of PAC as paired treatment and control sites; (2) criteria for selection of measurable indicators of change; (3) sampling design power analysis and expected observational error rates; (4) sampling procedures including monitoring cycle; (5) confidence levels to be applied in data analysis and reporting; (6) timeframe for evaluation of results; and (7) triggers for management adaptation using new information. The complete monitoring plan, including study design and analysis protocols, should be made available for public review and comment before a decision is made to implement the project.	alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C) the MSO amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. For these reasons, the amendment would not result in an important effect to the entire land management planning area. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). (196-17) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. The monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Regional Office in cooperation with the Rocky Mountain Bird Observatory. In

addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. Please note, the 2008 "Annual Report" discussed by commenter addresses the period of time from June 2005 to June 2007. It does not apply to the 4FRI project which has not yet been implemented. The Biological Opinion and incidental take statement discussed here are no longer in effect for either forest and were replaced for the Kaibab and Coconino NF in March 2012 with a new Biological Opinions for the 1987 and 1988 Forest Plans. In addition, the Kaibab NF is now under a new Biological Opinion signed September 10, 2013 for the Revised Forest Plan.

Furthermore, in our view, the Forest Service should study, develop and describe (rather than mention and dismiss) an action alternative that gives the decision-maker and the public a meaningful basis for comparison of impacts to Mexican spotted owl and its critical habitat. At a minimum, such an alternative should: · Implement existing forest plan standards and guidelines without amendment. · Avoid road construction in PACs. · Incorporate treatment concepts outlined above, including large tree retention, management of surface fuels and sub-canopy forest structure, and spatial orientation. · Apply spatial modeling of treatments, as conducted by Northern Arizona University Forest Ecosystem Restoration Analysis (Prather et al. 2008). The work of Prather and others (2008) is particularly relevant to this analysis because it is: (1) specific to the project area; (2) consistent with the purpose and need; (3) representative of the best available science; and (4) offers a meaningful basis for comparison of the intensity of environmental impacts that may result from the project. "[E]ven without application of treatments that would seriously affect MSO habitat, managers could achieve approximately 60% of the fuels reduction that would be achieved if there were no restrictions on treatments. With reasonable tradeoffs considered in planning, such as largely treating in lower suitability owl habitat, this figure would rise to over 80%" (Prather et al. 2008: 148). "When conservation and restoration planning is scaled-up from a stand to landscape scale, many apparent conflicts disappear as management actions are spatially partitioned and prioritized" (Prather et al. 2008: 149).

(196-18) Please see our previous responses regarding alternatives without plan amendments, large tree retention and spatial orientation. Road construction in PACS in discussed in comment 196-19. The findings of Prather et al. (2208) do not apply to the treatments proposed for MSO habitat. Prather et al. (2008) examine restoration and species conservation. The 4FRI proposes very light treatments (see tables 47, 49, 63, 64, 77, 78, 91, and 92 in the wildlife report) that in no way resemble restoration. The treatments are designed to retain and develop and large trees, promote large oak, and retain the other aspects of MSO habitat (Wildlife report pages 220, 253, 283, 305-307). As Prather et al. (2008) concluded, "even where policy conflicts exist, their magnitude has been overstated."

Lininger, Jay

Lininger, All of the action alternatives include 6.04 miles of new road

(196-19) A meaningful basis for comparison of impacts to MSO can be

Jay

construction in 13 PACs. “New road or trail construction is not recommended in PACs” (USDI 2012: 274). Even after proposed road decommissioning, which will decrease overall PAC road density at the project scale, total road mileage will increase in four PACs. This may cause incidental take of Mexican spotted owl and/or necessitate removal of old growth trees, but the DEIS fails to address either point. The DEIS also fails to report existing road mileage in three of the PACs where new construction is proposed, meaning that the affected environmental and consequences of the project remain undisclosed. New road construction may adversely affect primary constituent elements of Mexican spotted owl critical habitat, and this is a significant issue for analysis. The Forest Service must cease its practice of refusing to disclose the location and effects of new road construction and take a hard look at potential site-specific impacts to the environment. New roads can destroy large trees and coarse woody structure, permanently impair soil productivity and alter plant communities, and even if their use is temporary.

found in the wildlife report (pages 191-323). A new alternative based on proceeding without amendments will be developed for the FEIS. Road construction in PACs will be limited to improving non-system roads that currently exist on the ground. Some sections of the <7 miles of total temporary roads in PACs will not require additional work. Some may require site-specific actions such as felling trees, applying fill, etc., to bring them up to standard for operations. All temporary roads will decommissioned at the end of the project, bringing a net improvement over the current status of roads in PACs. PAC treatments were designed to retain and develop large trees and manage surface fuels (see tables 47, 49, 63, 64, 77, 78, 91, and 92 in the wildlife report).Nearly 100 miles of road maintenance and temporary road construction would occur in protected habitat (FEIS wildlife report, Table 57). Road maintenance and temporary construction would occur pre-harvest and outside of the nesting season. Also see our response to comment 180-57 as it relates to roads and MSO habitat. Regarding road impacts to large trees, the DEIS proposes no new permanent road construction (DEIS page 40, p 63, p 81, p 88). The DEIS proposes a reduction of current roads through the proposed decommissioning of 904 miles of road (DEIS @ p41, p 63, Table 18 p 74, p 81, p 88), thus actually decreasing the effects of roads that are currently located within the analysis area. The Chapter 3 soil and water analysis (DEIS, table 32, page 116 and pages 119-125) and (Soils Specialist report pages 62-92 and Attachment #1, page 165) shows less than 15% soil disturbance would occur (including temporary road construction) under all action alternatives which is less than 15% soil disturbance threshold identified that would maintain long term soil productivity. Temporary roads would be constructed to provide necessary access for forest treatments and decommissioned after use. The effects of roads are analyzed and disclosed at the following locations in the DEIS: pg. 26, para. 2; pg. 28, para. 3-5; pg. 29 para 1 and 2; pg. 40, para. 2; pg. 41, para. 1; pg. 47, para. 7; pg. 62, para. 6; pg. 63, para. 1; pg. 63, para. 2; pg. 65, table 16; pg. 74, table 18; pg. 81, para. 1; pg. 88, para. 2; pg. 109, para. 2; pg. 110, para. 3 and 6; pg. 111, para. 1; pg. 116, para. 2-4; pg. 142, para. 2 and table 52; 162, para. 2; pg. 185 (entire page); pg. 186, para. 1 and table 69; pg. 201, table 71; pg. 291, para. 6; pg. 221, para. 1. Additionally, Appendix C – provides design features, BMPs, and mitigation measures to protect soils and water

Lininger, Jay	The project area includes several water bodies that are on Arizona's "303(d)" list as impaired for water quality, particularly for mercury in fish tissue: Upper and Lower Lake Mary, Soldiers, Soldiers Annex, and Lower Long Lakes. According to page 41 of the Water Quality and Riparian Areas Specialist Report, "The [Arizona Dept. Environmental Quality – "ADEQ"] has concluded that watershed loading can potentially be reduced through management of sedimentation and vegetative stability. Recommendations included a review of upland and drainage conditions, so that areas requiring soil stabilization measures and channel improvements may be identified." The report further states on page 70: Short-term, localized adverse effects to surface water quality are possible in ephemeral drainages within or adjacent to high intensity treatment areas, Subwatersheds [sic] with greater treatment acreages, such as Walnut Creek-Upper Lake Mary (8,334 treatment acres), Upper Spring Valley Wash (7,369 treatment acres, and Volunteer Canyon (6,249 treatment acres) pose the highest risk of short term, localized adverse effects to water quality. Potential adverse effects include increases in turbidity, total dissolved solids, total suspended solids, and nutrients. Implementation of BMPs and SWCPs as specified in Table 1 would minimize adverse effects to surface water quality and riparian ecosystem function. The report is forthright on pages 44-45, 69 and 75 about the risks to riparian and aquatic systems from road	quality as they relate to roads. These include SW10-12, 14, 16, 17, 20, 22, 24, 30, and 31. The Riparian and Water Quality Specialist's Report provides a detailed description of the effects of forest roads on pg. 50 and 62-64.Page 60, paragraph 3 through page 61, paragraph 4 provides a more detailed description of the effects of roads on soil productivity and water quality, including construction and decommissioning. Finally, this section also notes that Implementation of effective Best Management Practices (BMPs) and Soil and Water Conservation Practices (SWCPs) during road decommissioning would improve surface water quality since these road segments would no longer be redirecting surface flows via ditches and delivering sediment and other pollutants directly to streamcourses. Decommissioning of 941 miles of roads would improve surface water quality, particularly where stream crossings would become naturalized over time. (196-20) In this comment, the following point is reiterated: "Implementation of BMPs and SWCPs as specified in Table 1 would minimize adverse effects to surface water quality and riparian ecosystem function." Additionally, Appendix C provides design features, BMPs, and mitigation measures to protect soils and water quality as they relate to mechanical forest treatments, prescribed fire, and roads. These practices have generally been shown to effectively minimize and mitigate adverse effects to soil productivity and water quality when properly implemented. As described on pg. 70, para. 4 in the Riparian and Water Quality Specialist's Report, It is unlikely that any of the Action Alternatives would contribute enough sediment or other pollutants to ephemeral or intermittent drainages within the project area to result in impairment of any downstream water bodies. The Kelly Motorized Trails Project was included in the cumulative effects analysis as a reasonably foreseeable recreation project in the soils and water quality and riparian analysis. In the DEIS the cumulative effects analysis is summarized in pages 120-121. In the FEIS (in response to comments on the DEIS), more of the analysis has been included in chapter 3 to improve clarity, see pages 149 to 152. Regarding a contingency plan, Appendix C provides design features, BMPs, and mitigation measures to protect soils and water quality as they relate to roads. These include SW10-12, 14, 16, 17, 20, 22, 24, 30, and 31. These practices have been proven effective at mitigating adverse effects to soil productivity and

construction and use in the project. Roads, skid trails and landings present a clear risk to riparian and aquatic habitats for increasing sedimentation, erosion, and turbidity, and they may cause the Forest Service to violate Total Maximum Daily Load ("TMDL") restrictions on water pollution. Therefore, the report admits on page 9, "Cumulative effects to water quality and riparian areas, when combined with past, present, and reasonably foreseeable future actions could be significant." The 4FRI project will be implemented simultaneously with the construction of the Kelly Motorized Trails Project. The Kelly project will bring increased usage to lands south of Lake Mary, and are likely to bring increased motorized traffic to the roads surrounding the Kelly trails. During and after 4FRI implementation, national forest lands will be opened to recreational motorized traffic with a significant but undisclosed mileage of newly constructed roads and reopened roads around Lake Mary. How will the Forest Service limit the cumulative effects of these two projects? How will it prevent trespass from the Kelly project onto roads used for the 4FRI project? How will it pay for increased enforcement and the need to completely obscure closed and re-closed roads after 4FRI project implementation? The Forest Service must describe cumulative impacts of the Kelly project and 4FRI project and offer a plan for controlling motorized vehicle traffic onto the roads to be constructed and used in the action alternatives. The plan should account for the costs of thoroughly obliterating and completely obscuring roads around the Kelly project area. The Forest Service should also offer a contingency plan should TMDL levels in Lake Mary increase as a result of the two projects.

According to pages 76-77 of the Water Quality and Riparian Areas Specialist Report supporting the DEIS, "Although there are no quantifiable data regarding the impacts that vertebrate herbivores and OHV traffic have on aspen stands and springs of the KNF and CNF, it is generally accepted that adverse effects to aspen stands and spring habitats from these activities are occurring." The Forest Service intends to rely on approximately 82 miles of aspen fencing to control for these risks to aspen forests. It should explain why it will rely on fencing instead of taking proactive measures to limit motorized vehicle traffic, reintroduce natural predators, and limit water quality when properly implemented.

Lininger, Jay

(196-21) Aspen treatments would only occur if there is an ability to fence the treated stand afterwards. Fencing would be of an adequate design to preclude grazing of suckers by elk or livestock (DEIS pages vi, vii, 41, 47, 62, 63, 74, 81, 88, 95, 142, 288, 306,606, 640, and 691; wildlife report pages 93, 153, 155, 156, 158, 238, 270, 435,447, 572, and 581).

	livestock damage to aspen. When large predators, particularly wolves, were reintroduced to Yellowstone National Park, USA, and Banff National Park, Canada, the wolves brought elk populations to manageable levels, and as a result of the decrease in grazing pressure, aspen populations near wolves rebounded (Hebblewhite et al. 2005, Ripple and Beschta 2007). How will the costs of fencing construction and maintenance for years into the future compare with the costs of removing artificial water supplies that occur within several miles of aspen stands, or with the costs of removing roads that pass through aspen stands and allow vehicle trespass? All of the action alternatives would amend standards and guidelines of the forestplans. The DEIS fails to support a finding that the plan amendments are "nonsignificant" because the public cannot use the information contained in it to determine the acres affected or their relationship to other anticipated uses under the plans. For example, the Forest Service does not disclose the method or analysis it used to determine that the amendment regarding canopy cover in ponderosa pine forest would affect only 18 percent of goshawk habitat in the Coconino National Forest and 20 percent of habitat in the Kaibab National Forest. Proposed treatments in goshawk habitat are far more extensive than that. We previously commented to the Forest Service that the proposed amendments are "significant." In particular, they may bring about "Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area." FSM 1926.52 (Jan. 31, 2006). This is particularly evident in light of facts, discussed above, that the Forest Service is concurrently advancing identical plan amendments in every pending action on the Coconino National Forest with a similar purpose and need. The Forest Service should account for cumulative effects of its efforts to unravel current	
Lininger, Jay	management direction and follow the procedures required for developing and approving forest plans.	(196-22) Please see our previous responses.
Lininger, Jay	Attachment to the comment letter #180 submitted by J. Lininger on behalf of CBD.This is the fourth attachment for letter #180 and it contains a duplication of the comments from CBD on the DEIS.	(204-1) See responses to letter 180.
Lopez, Maricruz	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who	Thank you for your comment. Please see our response to Letter #19.

enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for

incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI

Love, Chris

(61-1) Thank you for your comments. Please see our response to letter #19.

	implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Mackin, Tom	The Arizona Wildlife Federation would like to go on record in support of the preferred alternative. The wide range of treatments described, the attention to wildlife habitat and the stated commitment to ongoing adaptive management once the implementation phase commences are all factors that went into our decision. The most significant challenge will be the funding for ongoing adaptive management and they way those recommendations are handled. Restoring forest functionality after almost a century of fuel buildups, overcrowding in many locations, degraded springs and seeps and excessive road densities pose huge problems to overcome. With climate change already impacting the treatment area, any delays due to litigation, contractor funding, additional catastrophic wildfires and public objection to the use of prescribed fire, will further intensify the problems. As a member of the stakeholder group, many of our concerns have already been identified and incorporated into the larger comment document submitted by that collaboration. In closing we appreciate the effort that has gone into this DEIS and we look forward to further proceedings in a timely manner.	(179-1) Thank you for time and participation in this project throughout the planning phase.
Martin, Tommie Cline	Gila County is located in eastern Arizona beneath the Mogollon Rim that marks the southern edge of the Colorado plateau. Gila County has been a stakeholder in the effort to develop and implement landscape scale forested ecosystems restoration for the last decade and has been involved in the creation of the White Mountains Stewardship Project; the Governor's Forest Health Council's Statewide Strategy for Restoring Arizona Forests; the collaborative Analysis of Small-Diameter Wood Supply in Northern Arizona; and, what has become the Four Forest Restoration Initiative. Gila County appreciates the opportunity to comment on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative, and would like to offer the following comments, gap analysis and	(163-1) Thank you for your time and attention.

Martin, Tommie Cline	suggested actions: In summary, Gila County wants to state its overwhelming support for the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the suggestions provided by the County and other stakeholders integral to the sustainability of the 4FRI social license. Therefore, the concerns and suggestions provided by Gila County are not aimed at questioning the need to implement 4FRI, but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process that could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project, as intended by the County.	(163-2) Thank you for your review and comments. Thank you for recognizing the tremendous collaborative effort that has gone into the analysis, writing, and review creating the 4FRI DEIS. We appreciate your contribution to the further refinement of the DEIS by voicing your concerns and suggestions by way of your comments. Your concerns and suggestions have been noted in the specific responses to the comments which follow.
Martin, Tommie Cline	Gila County is fully aware that per Sec. 1503.4 Response to comments, the USFS 4FRI Team may elect to "Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response" (Sub Sec. 5). However, this is not the expectation of the County. Rather, the County expects that the USFS 4FRI Team will receive Gila County's comments in the spirit of continuous improvement and risk mitigation in which they were written, and elect to "Modify alternatives including the proposed action" (Sub Sec. 1), and "Supplement, improve, or modify its analyses" (Sub Sec. 3) as allowed for under Sec. 1503.4.	(163-3) Your comments have been noted. Thank you for your involvement in the 4FRI DEIS comment process.
Martin, Tommie Cline	The County stands ready and willing to further address or discuss the points we raise herein and invite your reviewers to contact us.	(163-4) Thank you for collaborating on this restoration project.
Martin, Tommie Cline	For ease of reading, Gila County's extensive, specific and detailed comments have been organized in chapter form, and a table of contents is inserted on the following pages to facilitate the navigation of the document: Gila County's Objectives as Expressed in its Plans and Policies Gila County Gila County ("the County") is located in central Arizona beneath the Mogollon Rim that marks the southern edge of the Colorado Plateau. Five characteristics of the County are particularly relevant to the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative ("the 4FRI DEIS"): 1) One of the four national forests regrouped into the Four	(163-5) Thank you for your comment.

Martin, Tommie Cline	Forest Restoration Initiative (“4FRI”), the Tonto National Forest, is located within and around Gila County. 2) The Tonto National Forest occupies a very large proportion (55%) of the area of the County. 3) The landscape scale catastrophic wildfires in the national forests of the Southwest have a disproportionately large impact on the ecological, social and economic life of Gila County and the neighboring eastern Arizona counties, and on the health and safety of their residents and visitors. Four of the five largest wildfires in Arizona, including two of the largest wildfires in the nation, have occurred within the five counties of the Eastern Arizona Counties Organization in the last decade: the Rodeo Chediski Fire of 2002 that consumed 460,000 acres and the Wallow Fire of 2011 that charred 538,000 acres. On the Tonto Forest alone, the Willow Fire of 2004 burned 120,000 acres and the Cave Creek Complex Fire of 2005 blazed through 244,000 acres. When you also add to the Tonto’s recent fire history the Lone Fire of 1996 that charred 61,000 acres; the 2005 Edge Complex Fire that burned 72,000 acres; the 18,000 acre Sunflower and the 6,000 acre Tanner fires of 2011; and the 12,000 acre Poco Fire of 2012 then you begin to understand Gila County’s awareness, concern and involvement in this discussion. Gila County got a “wake-up call” as to what was in our and the Tonto Forest’s future as far back as 1990. Prior to these more recent fires, the deadly Dude Fire of 1990, while burning ‘only’ 24,000 acres, was the largest forest fire in modern Arizona times. It destroyed 60 homes, caused the evacuation of 1,100 people, and -- worst of all -- killed 6 firefighters. 4) Outdoor recreational activities conducted in the 4FRI national forests, such as, but not limited to, camping, motorized recreation, hunting, fishing, hiking, etc. by the local residents, and by visitors to the County recreating from metro Arizona to the Rim Country, have a disproportionately large impact on the economic well-being and the economic development of the County. 5) The County has made a long term commitment to proactively participate in, assume leadership roles in and provide political support at the state and federal levels for forest restoration and wildfire prevention efforts at local and landscape scales, such as the White Mountain Stewardship Project and the Four Forest Restoration Initiative that the County has been instrumental in	(163-6) Thank you for your comment and interest in the 4FRI project.

Martin, Tommie Cline	creating and fostering. As such, Gila County has a special interest in the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative. While Gila County recognizes that it is only one of the many constituents of the U.S. Forest Service, and does not seek special consideration in the current comments and review process, we urge the Responsible Official to pay careful attention and give due consideration to the following comments in view of the uncommonly large effect that Forest Service land management decisions regularly have directly, or may occasionally have indirectly, on the County' residents and visitors' enjoyment, custom, culture, health, safety and economic well-being.	(163-7) Thank you for your comment.
Martin, Tommie Cline	Gila County, therefore, understands particularly well the issues at hand, the management processes engaged, the desired future conditions, and the difficulties and challenges involved. The County appreciates fully the USFS 4FRI Team's intent to: i) ensure an adaptive management planning and implementation process that is inclusive, efficient, collaborative and science-based to promote healthy, resilient, diverse and productive national forests and grasslands; ii) support natural resources-based rural economic development and employment; and, iii) ensure the enjoyment of the 4FRI national forests by the current and future generations in a balanced approach of preservation, conservation and sustainable exploitation of the natural resources.	(163-9) Thank you for your comment.
Martin, Tommie Cline	In a spirit of continuous improvement, and based on the direct practitioner knowledge and experience gained through a uniquely long, diverse, often productive and sometimes difficult participation in the Forest Service planning and implementation processes, Gila County would like to share its comments, its appreciation for the obvious work put into the 4FRI DEIS, and its concerns and suggestions as follows.	(163-10) Thank you for your participation in the 4FRI collaborative process.
Martin, Tommie Cline	Gila County recognizes that the 4FRI DEIS is a Forest Service-driven technical process, and generally supports the analysis mechanisms deployed by the USFS 4FRI Team to complete the assessment and the technical part of the planning. Although Gila County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define	(163-11) Thank you for your review and comments. Thank you for recognizing the tremendous collaborative effort that has gone into the analysis, writing, and review creating the 4FRI DEIS. We appreciate your contribution to the further refinement of the DEIS by voicing your concerns and suggestions by way of your comments. Your concerns and suggestions have been noted in the specific responses to the comments

Martin, Tommie Cline	its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as an organization representing the most direct and local expression of democratic government at the individual district or national forest level, the County more generally defines its role at the policy-making level as it relates to public lands management processes. Although several of the following comments do apply to the technical aspects of the 4FRI planning processes, they purposefully do not address specific technical mechanisms thereof, and Gila County is mostly satisfied that the USFS methodology is generally satisfactory, and that the studies that the USFS 4FRI Team in their expertise deem reliable, are adequate to support their technical conclusions (Lands Council v. McNair 537 F.3d 981 - 9th Cir. 2008). Therefore, Gila County will focus its engagement in the 4FRI DEIS process, and its comments and suggestions, at the policy-making level and on whether the 4FRI Preferred Alternative contributes to the County's residents' and visitor's enjoyment, custom, culture, health, safety and economic well-being. The County will further focus its engagement on whether the 4FRI Preferred Alternative is consistent with the objectives of the County as expressed in its plans and policies; on how the 4FRI project impacts related planning efforts by the County; and, on the compatibility with and interrelated impacts of the 4FRI project and the County's plans and policies. Per the requirements contained in the 2012 Planning Rule, Title 36 - Parks, Forests, And Public Property, Part 219 - Planning, Subpart A - National Forest System Land Management Planning, Section 4 - Requirements for public participation, subsection (b) Coordination with other public planning efforts, Gila County expects that: "The responsible official shall coordinate land management planning with the equivalent and related planning efforts of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments" (36 CFR 219.4 (b)(1)). Gila County also expects that: "The results of this review shall be displayed in the environmental impact statement (EIS) for the plan", and that "this review shall include consideration of: (i) The objectives of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments, as expressed in their	which follow. (163-12) Thank you for referencing the 2012 Planning Rule. This project has been reviewed against the direction in the current Coconino National Forest Plan (forest plan), as amended (USDA 1987), the Land and Resource Management Plan for the Kaibab National Forest, as revised (USDA 2014) and 36 CFR 219.17(b)(3). For clarification, this project has proposed three nonsignificant forest plan amendments for the Coconino NF. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b)(3) provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule.

	plans and policies; (ii) The compatibility and interrelated impacts of these plans and policies; (iii) Opportunities for the plan to address the impacts identified or to contribute to joint objectives; and, (iv) Opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives" (36 CFR 219.4 (b)(2)).	
Martin, Tommie Cline	Gila County posits that these statutory requirements are meant by Congress to imply more than a perfunctory review process resulting in a check mark in a 'coordination box' and imply a sincere and proactive resolution effort to reduce and resolve potential conflicts between aspects of 4FRI DEIS and objectives expressed in the County's plans and policies; such as, but not limited to, those relevant to forested ecosystems restoration and catastrophic wildfire prevention objectives, watersheds restoration objectives, rangelands resources management objectives, or forest products resources management objectives.	(163-13) The comments from the Eastern Counties Organization (ECO), as well as other comments received during the official comment period, have been read, reviewed, and discussed by the 4FRI specialists. A summary of responses by topic will be part of the FEIS. The complete individual comment analysis will be posted on the project's website and filed in the project record. The Forests have collaborated with 4FRI stakeholders and interested publics including the Eastern Counties Organization. The DEIS (chapter 1) and FEIS (chapter 1) documents how collaboration was used during the planning process.
Martin, Tommie Cline	Gila County is committed to resolve or reduce potential conflicts between the 4FRI DEIS and the County's plans and policies, and understands that such resolution must take place within the context of developing the 4FRI project's desired conditions or objectives. To this effect, it is the intent of Gila County to avail itself of the opportunity contained in the 2012 Planning Rule that specifies that: "Where appropriate, the responsible official shall encourage States, County, and other local governments to seek cooperating agency status in the NEPA process for development, amendment, or revision of a plan" (36 CFR 219.4 (a)(1)(iv)).	(163-14) In 2011 the Arizona Game and Fish Department (AGFD) was designated a cooperating agency. The AGFD provided wildlife data and wildlife analysis support for this project-level environmental analysis (DEIS, Chapter 1).
Martin, Tommie Cline	The County's policy making decisions and management actions are guided by the County plan. This plan guides the actions of the Board of Supervisors and the County staff toward meeting the present and future enjoyment, custom, culture, health, safety and economic well-being needs of the County's residents or visitors. The County planning effort integrates the principles of: 1) Monitoring the effects and impacts of the implementation of the County policies, as well as the direct, indirect, individual and cumulative effects and impacts on the County and its residents and visitors of the policy decisions and management actions taken by state and federal agency partners; 2) Monitoring all demographic, social, economic, cultural and other	(163-15) Thank you for your comments. All comments received on this project have been filed in the project record.

	variables, whether internal or external, which are relevant to the County's policy making decisions and management actions; and, 3) Dynamic and generally informal adaptive management. As such, the County plan is an evolving dynamic plan that constantly adapts, often informally, in response to the evolving ecological, economic, social and cultural environment, and that is formulated as much through the regular deliberations of the County's Board of Supervisors and the resulting Resolutions of the Board, as it is in the formal planning documents. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), the County plan defined as the accumulation of the formal County planning documents and the County public record of Board of Supervisors deliberations and resolutions, is hereby entered into the 4FRI NEPA record. Gila County's Objectives Relating to the 4FRI EIS Gila County appreciates and supports the extensive and thorough analysis performed by the USFS 4FRI Team for the 4FRI DEIS, and the discussion of the effects of the no action alternative and the three action alternatives on: Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; Transportation; Climate Change; Short-term Uses and Long-term Productivity; Unavoidable Adverse Effects; Irreversible and Irretrievable Commitments of Resources; and, Cumulative Effects. Multiple resources analyzed individually by the USFS 4FRI Team in the 4FRI DEIS are regrouped in a smaller number of overarching natural resources management policy objectives by the County. In no particular order, the County's natural resources management objectives relevant to the 4FRI DEIS comments include: 1) Rangelands Resources Management Objectives. Rangelands Resources Management Objectives address issues such as, but are not limited to, grazing availability, suitability, sustainability; ecological, economic and social carrying capacity; access; contribution to rural economic development; and, contribution to local Western custom and culture. 2) Forest Products Resources	Martin, Tommie Cline	(163-10) Thank you for your explanation of how the resources were regrouped for Gila County's analysis of the 4FRI DEIS.

Management Objectives. Forest Products Management Resources Objectives address issues such as, but are not limited to, logging availability, suitability, sustainability, productivity, access; contribution to rural economic development; and, contribution to rural Western custom and culture. 3) Mineral and Energy Resources Management Objectives. Mineral and Energy Resources Management Objectives address issues such as, but are not limited to, the availability, suitability, sustainability, productivity, access, and contribution to rural economic development of (a) solid, liquid or gaseous mineral resources and (b) solar, wind, hydropower, geothermal and other natural renewable energy resources. 4) Motorized Travel and Recreation Management Objectives. Motorized Travel and Recreation Management Objectives address issues such as, but are not limited to, motorized access; motorized travel; motorized big game retrieval; motorized dispersed camping; motorized gathering of firewood; motorized access to dispersed fishing; motorized recreation opportunities; inventoried roadless areas; wilderness area designation; motorized access to grazing and logging opportunities; contribution of motorized access, recreation and travel to rural economic development; and, contribution to local Western custom and culture. 5) Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives. Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives address issues such as, but are not limited to, protection of County's residents and visitors; protection of collective and individual real properties; protection of transportation, energy and water collection and distribution infrastructures; ecological restoration of forested ecosystems; local scale restoration projects; landscape scale restoration projects; social license required for the non-conflictual and non-litigious implementation of restoration efforts (such as the one requested in public statements by former USFS Southwestern Regional Forester Corbin Newman for the Four Forest Restoration Initiative); industry development required to implement and fund restoration efforts through economically viable utilization of the wood products; and, long term guarantees of wood supply necessary to attract private investments in a small diameter utilization infrastructure in northeastern Arizona. 6) Watershed

	Restoration Objectives. Watershed Restoration Objectives address issues such as, but are not limited to, ecological restoration of watersheds; protection and development of water collection and distribution infrastructures; monetization of watershed ecosystem services; downstream consumption contribution to upstream production investments and maintenance; and, interactions between watershed functions and multiple use functions. 7) Management Areas Designation Objectives. Management Areas Designation Objectives address issues such as, but are not limited to, the nomination, designation, and management of (a) inventoried roadless areas (which are technically not management areas per se but are an administrative designation) and (b) wilderness areas, primitive areas, research natural areas, wildlife quiet areas, and wild and scenic rivers; and, effects on socioeconomic resources and impacts on the other County objectives. Gila County understands that some of these objectives are not directly relevant to the 4FRI DEIS inasmuch as, for example, the 4FRI alternatives are not contemplating the designation of management areas. However, most of these objectives are relevant to the 4FRI DEIS, inasmuch as the 4FRI alternatives either have direct effects on some County's objectives, such as Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives; Forest Products Resources Management Objectives; Watershed Restoration	
Martin, Tommie Cline	Objectives; and, Rangelands Resources Management Objectives; or, may have indirect effects on some County's objectives, such as Motorized Travel and Recreation Management Objectives.	(163-17) For clarification, this analysis will not make grazing authorization decisions. This analysis will not be determining whether a road or route will be closed or part of a designated, transportation system. Those decisions occur in travel management-related analyses.
	For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), this document:	
Martin, Tommie Cline	Gila County comments on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative is hereby incorporated into the County's expressed plans and policies.	(163-18) Thank you for the information.
	Per the requirements of 36 CFR 219.4 (b)(2), 40 CFR 1502.16(c) and 40 CFR 1506.2, Gila County hereby requests that the results of the	(163-19) Thank you for your comments. All comments received on the draft EIS from Federal, State and local agencies have been included in appendix I of the FEIS on pages 925 to 994. This satisfies Section 102 (c) of NEPA which states, comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce
Martin, Tommie Cline	consistency review and coordination action between the 4FRI DEIS and the County's objectives as expressed in its plans and policies shall be displayed in the Four Forest Restoration Initiative	

	Environmental Impact Statement.	environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public. Although the project only directly affects Coconino County, comments from the Eastern Arizona Counties Organization has been included to reflect similar comments received from Apache, Gila, Graham, Greenlee and Navajo County. Per 40 CFR 1503.4, summarized responses to comments received on the draft EIS are included in this appendix. They have been organized by topic. All comments received on the draft EIS are available for public review at: https://cara.ecosystem-management.org/Public/Letter/172405?project=34857. All comments received were reviewed and responded to individually. The complete comment analysis and response document is located in the project record and is available on the project's website at: http://www.fs.usda.gov/main/4fri/planning.
Martin, Tommie Cline	Gila County appreciates and supports the fact that all three action alternatives include a clear priority for restoration treatments (PDEIS p. 62).	(163-20) Thank you for your comment. For clarification, the DEIS was not programmatic but site-specific. We assumed the (PDEIS) reference in this comment was to a programmatic document.
Martin, Tommie Cline	Gila County recognizes that the issues of forested ecosystem restoration and forest products management are fundamentally different, and are typically not discussed simultaneously in ecosystems non-departed or little departed from characteristic reference conditions. However, as the Forest Service and the County both generally acknowledge: current conditions in the forested ecosystems and especially in the ponderosa pine and dry or wet mixed conifers-dominated forests of eastern Arizona are considerably departed from reference conditions, and at risk of continued uncharacteristic disturbances such as landscape scale catastrophic crown fires or insect infestations.	(163-21) Thank you for this information.
Martin, Tommie Cline	Also, Gila County acknowledges and appreciates the efforts made by the Forest Service, and particularly the Arizona national forests, to pioneer larger scale restoration efforts such as the White Mountains Stewardship Project. The County has been and continues to be supportive of the White Mountain Stewardship Project and of its funding as a practical tool to initiate larger scale treatments and to incentivize the creation of a small diameter trees utilization infrastructure. Simultaneously, the County acknowledges that the model of subsidized restoration treatments is not scalable at	(163-23) Thank you for this information.

	landscape level, as is required to restore the forests of Arizona, for lack of agency funding. As proposed in the Four Forest Restoration Initiative, an initiative that the County was instrumental in creating, fostering and developing, landscape scale forest ecological restoration appears currently feasible only if it is funded by the economically viable utilization of the forested byproducts of restoration by private industry. While it is actually not a novation when it comes to forest products, as timber sales have been for centuries an established form of natural resources valuation and have funded the management of the resources, the concept of ecosystem services monetization is relatively new to the discussion of ecological restoration funding, and its full implications are still being tested. As a consequence, Gila County suggests that both the County and the USFS 4FRI Team operate under a very specific constraint when it comes to forest restoration, inasmuch as the forest products industry in Arizona is the funding mechanism for landscape scale restoration in eastern Arizona, which imposes the concept of social acceptability or 'social license' for appropriate scale industry to fund restoration logging activities at the landscape scale throughout the 4FRI project.	
Martin, Tommie Cline		(163-24) Thank you for your comment.
	Gila County's Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives for the upcoming planning cycle include, among others: 1) Design and implement landscape-scale, consensus-based, industry-supported, accelerated community protection and forested ecosystems restoration in the 2.4 million acre ponderosa pine and mixed conifer-dominated forests of the Mogollon Rim. 2) Develop and sustain the social license required by Southwestern Regional Forester Corbin Newman as a prerequisite to the implementation of industry-supported landscape scale restoration. 3) Participate actively in the NEPA process, as a member of the public and as a Cooperating Agency, and provide robust comments to the Forest Service to ensure NEPA process integrity and survivability in the face of potential threats of litigation. Emphasize with the Forest Service a strategy of risk mitigation and focus on the end goal of accelerated restoration over partisan debates and exclusive focus on technical sciences to the detriment of social science and social license. 4) Create in eastern Arizona the wood	
Martin, Tommie Cline		(163-25) Thank you for this information.

	supply conditions for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 5) Wherever and whenever possible, prioritize forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona with multiple industrial scale new investments.	
Martin, Tommie Cline	Gila County appreciates and supports the fact that all three action alternatives include a clear focus on mechanical restoration treatments yielding forest products (PDEIS p. 62).	(163-26) Thank you for your comment. As noted, the DEIS socioeconomic analysis (web-based DEIS, pp. 272-284) evaluated the direct and indirect economic output for each alternative.
Martin, Tommie Cline	The inherent challenge faced by Gila County and the USFS 4FRI Team is that the priorities typically considered when managing forest products, such as a sustained yield of harvest volumes on a regulated non-declining even-flow basis for the long term, uneven age structures, long term sustained yield capacity (LTSYC), non-declining allowable sale quantity (ASQ), etc., are augmented and complicated, and to a large extent superseded, by the overwhelming priority to complete landscape scale restoration as rapidly as possible for fear of massively disruptive landscape scale catastrophic crown fires and/or landscape scale insect or disease infestations.	(163-27) Thank you for your comment.
Martin, Tommie Cline	Owing to the fact that for the foreseeable future green forest products will likely be byproducts of restoration treatments, and green forest products will likely continue to be at risk of destruction by catastrophic fires if landscape scale restoration is not expeditiously implemented, the County suggests that forest products management actions for the upcoming planning cycle must be dictated not only by traditional silviculture science and best practices, but primarily by the absolute priority of implementing landscape scale restoration as expeditiously as possible using mechanical treatments that produce the forest products necessary to not only sustain the existing forest industry in the White Mountains,	(163-28) Thank you for your suggestion.

	but also to allow robust natural resources-based rural economic development through the creation of an entirely new infrastructure of small diameter trees utilization at industrial scale. Gila County's Forest Products Resources Objectives for the upcoming planning cycle include, among others: 1) Create in eastern Arizona the wood supply conditions necessary for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 2) Sustain in the White Mountains the wood supply conditions necessary for the continued development and growth of the existing local industry, with expanded economically viable small diameter trees and residual biomass utilization facilities capable of funding the initial ecological restoration thinning of at least 15,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 3) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for sustained yield of harvest volumes on a regulated, non-declining even-flow basis for the long term, to the overriding priority of implementing as expeditiously as possible landscape scale restoration based primarily on mechanical treatments producing forest products. 4) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for uneven age management to the overriding necessity of sustaining the social license required to implement landscape scale restoration expeditiously and in a non-conflictual and non-litigious	
Martin, Tommie Cline	manner, as relates to the protection of old growth and the retention of large trees (upcoming old growth) where vegetative structural stages (VSS) 5 and 6 are deficient at stand or forest scale.	(163-29) Thank you for this information.
Martin, Tommie Cline	Gila County appreciates and supports the analysis performed by the USFS 4FRI Team using the Watershed Condition Framework (WCF) to identify 6th level Hydrologic Unit Code (HUC) Class 1 (Functioning),	(163-30) Thank you for your comment.

Martin, Tommie Cline	Class 2 (Functioning-At-Risk) and Class 3 (Impaired) watersheds in the 4FRI project area, and to analyze the direct and indirect effects of the 4FRI project on water quality and water yield. Uncharacteristic landscape scale forest crown fires in eastern Arizona have a demonstrated negative impact on the conservation and operation of the watersheds in which they occur. In addition to the damages caused to communities and ecosystems by the fires themselves, the most common negative effects on watersheds documented after the Rodeo-Chediski Fire, the Wallow Fire, in some areas, and the Schultz Fire, among others, are: uncharacteristic runoffs, catastrophic flooding, accelerated and aggravated soil erosion, streams and reservoirs sedimentation, and long term severe disturbance of the watershed functions. The Rim Country constitutes a large portion of the watersheds that contribute significantly to the water supply of the metro Arizona and greater Phoenix area. The threat of additional uncharacteristic landscape scale forest crown fires in eastern Arizona, especially on the south slopes of the Mogollon Rim, raises serious concerns about the conservation and operation of the eastern Arizona watersheds. Additionally, the specific risk to the East Clear Creek watershed poses an existential threat to the Town of Payson's water supply. With the growing realization that uncharacteristic landscape scale forest crown fires affect the conservation and operation of the watersheds in which they occur, efforts to protect watersheds have recently been initiated in the Southwest. Several of these efforts focus on the monetization of the ecosystem services provided by the watersheds, and on an attempt to enroll the financial contribution of the downstream beneficiaries of the services (water consumers in this case) to the financial costs of protecting the upstream provider areas and the utility corridors delivering the services (forests, watersheds and water collection and distribution infrastructures at risk of catastrophic fires in this case). Such efforts were pioneered by the Denver Forest to Faucet project in Colorado, or the Santa Fe Municipal Watershed Protection project in New Mexico, among others. In Arizona, with the active contribution of Gila County, an effort to create the Arizona Watersheds Investment Fund (AWIF) is underway, and in Flagstaff, Ballot Question #405 received electors'	(163-31) Thank you for your comment concerning the effects of high-severity fire on watershed functions.

Martin, Tommie Cline	approval in November 2012 for the issuance of a $10 million municipal bond to finance the restoration treatments of high threat areas in the Rio de Flag and Lake Mary watersheds to provide greater protection to the community from the impacts of fires and floods. Therefore, the restoration of forested ecosystems, ponderosa pine and mixed conifer-dominated, in the watersheds of the Mogollon Rim in general, and specifically in the East Clear Creek watershed, is an objective priority, among other areas in eastern Arizona also in need of restoration treatments, for Gila County, after the direct protection of communities and infrastructures. Gila County's Watershed Restoration Objectives for the upcoming planning cycle include, among others: 1) Prioritize restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures, on the slopes of the Mogollon Rim in general, and specifically in the East Clear Creek, Verde River, Little Colorado River, Upper Gila River, and Upper Salt River watersheds. 2) Develop the Arizona Watersheds Investment Fund (AWIF), and/or similar initiatives in order to fund restoration treatments that cannot be funded by the wood industry utilization of the forest byproducts of restoration in areas where the merchantable material yield is insufficient for mechanical treatments to be economically viable, or access by mechanical harvesting equipment is restricted, such as in steep slopes, high erosion areas, riparian areas, etc. 3) Develop in parallel and in a complementary manner all models of watersheds restoration funding such as industry funding, ecosystem services funding, municipal bonds funding, etc.	(163-32) Thank you for this information.
Martin, Tommie Cline	Gila County appreciates the addition of grassland restoration treatments to forestland treatments in Alternative C, the Preferred Alternative. The County believes that this addition is significant not only because it implies the restoration of approximately 50,000 acres of rangelands, but because it aptly diversifies the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape restoration.' Gila County's Rangelands Resources Management Objectives Gila County's Rangelands Resources Objectives for the upcoming planning cycle include, among others:	(163-33) Thank you for your comment.

1) Restore encroached grasslands, including the most departed semi-desert, Great Basin, and montane subalpine grasslands that have been invaded by trees (subalpine grasslands) and shrubs (semi desert and Great Basin grasslands) by removing trees and shrubs where economically feasible, promoting a mixture of native perennial grass species, implementing the periodic prescriptive use of mixed classes of livestock matching animal feeding habits with specific plant material, and reintroducing a regime of cool surface fires in order to reduce trees and shrubs colonization and erosion hazards, and to increase livestock forage production. 2) Adopt management practices that discourage the establishment of nonnative species and eradicate invasive weed species that have little to no forage value, recognizing the fact that the ecological or economic consequences of different exotic species are not all the same, and that the persistence of some nonnative species that are not necessarily undesirable or controllable, such as Kentucky bluegrass or Bermuda grass, may be beneficial from a socioeconomic perspective and a balanced management for multiple resource objectives. 3) Allocate grass reserves on an allotment-by-allotment basis through proper range management, rather than on a district-by-district basis, which requires additional financial considerations for improvement maintenance. 4) Shift the grassland management process from the concept of balancing livestock grazing with available forage - which only addresses stocking rate - toward the concept of managing the intensity, frequency, seasonality, duration and classes of livestock grazing to accomplish the rangelands resources management objectives. 5) Emphasize adaptive management of the rangelands using a three step rangelands resources management monitoring approach of quantitative monitoring using standard measurements such as stocking rate, ground cover, etc.; qualitative monitoring using measurements such as species composition, age, nutritional value, etc.; and, effectiveness monitoring using outcome measurements such as range health, soil water holding capacity, soil organic content, livestock weight gain, wildlife indicator species, etc., in order to measure whether the management actions produce the site specific and cumulative direct and indirect effects desired. 6) Integrate the scientific research and implement the science-based

recommendations developed by rangelands resources management experts and scientists. 7) Preserve the contributions of the rangelands resources to the economic development and the custom and culture of the rural Arizona counties.

Gila County would like to preface any subsequent comment by the following four preliminary comments: 1. The quality and thoroughness of the work exhibited by the USFS 4FRI Team in the 4FRI DEIS is outstanding. Gila County is fully conscious of the fact that an enormous commitment was made and delivered upon by the USFS 4FRI Team, and that a legitimate pride of ownership must rest with the authors of the DEIS, as well as the Specialists' reports and other documents not published with the 4FRI DEIS but nonetheless part of the 4FRI project record. The County urges the USFS 4FRI Team to consider the County's comments NOT as a critic of their work, but as a goodwill effort toward continuous improvement of the 4FRI EIS, and as a proactive effort by the County to disclose its objectives, plans and policies, and the rationales that support them, to facilitate the statutorily required consistency review, coordination action and conflict reduction regarding potential discrepancies between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and as discussed in this document. 2. Strategically, Gila County overwhelmingly supports the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the following suggestions. Therefore, the following concerns and suggestions are not aimed at questioning the need to implement 4FRI but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process, which could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project as intended by the County. 3. Gila County readily acknowledges that several of the following comments and suggestions have already been addressed and agreed upon by the USFS 4FRI Team in the course of the work conducted by the DEIS Review Workgroup of the 4FRI Stakeholders Group with the USFS 4FRI Team. Also, considering the participation of the County in both the 4FRI Stakeholders Group and the DEIS Review Workgroup, there is a high probability that there will be some level of repetition and

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(163-34) Thank you for your review and comments. Thank you for recognizing the tremendous collaborative effort that has gone into the analysis, writing, and review creating the 4FRI DEIS. We appreciate your contribution to the further refinement of the DEIS by voicing your concerns and suggestions by way of your comments. Your concerns and suggestions have been noted in the specific responses to the comments which follow.

redundancy between the County's comments and the 4FRI Stakeholders Group comments, as well as comments from other stakeholders. Nonetheless, the NEPA process calls for comments on the DEIS as published, and for the formulation of the County's concerns and suggestions, regardless of whether these are echoed in other comments or not. 4. As previously noted, although Gila County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as a body representing the most direct and local expression of democratic government at the individual district or national forest level, Gila County more generally defines its role at the policy-making level as it relates to public lands management processes. Gila County, therefore, believes that it is appropriate to comment at the programmatic level, from a Forest Service perspective, and at the objectives level, from a County's policy perspective.

For clarification, Gila County wants to emphasize that although it generally supports the use of Best Available Scientific Information (BASI) for management decision, it does not support the exclusive use of technical sciences to formulate policies or to make strategic decisions that have an important impact on people. The County believes that these decisions must integrate social sciences in the decision making process. For example, the County believes that while there is no overwhelming supporting science on either side of the long debated issue of a universal diameter cap for restoration treatments (whether it be 9", 12", 16" or 18"), analyzing the issue of a diameter cap from just a technical science perspective is at best incomplete, because the issue of large trees retention is not only a technical issue, but also a social issue that cannot be adequately addressed by an exclusively scientific approach. Therefore, Gila County comments will purposefully not emphasize technical issues of silviculture, such as uneven aged composition, regeneration openings, etc., but will be focused on what the County believe to be the crux of the successful and timely implementation of the overriding priority of landscape scale scientifically and socially acceptable – if admittedly imperfect – ecological restoration and

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(163-35) Thank you for your comment. We used the best available science when developing the purpose and need and analyzing the effects of each alternative. What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, scientific uncertainty, and risk. See 40 CFR, 1502.9 (b), 1502.22, 1502.24 (USDA FS 2007). In the DEIS, an alternative was considered but eliminated from detailed study that would have limited mechanical treatments to 8-inch d.b.h. This alternative was based on the assertion that crown fire can be effectively addressed with mechanical treatments that do not cut trees larger than 8 inches d.b.h. Small diameter mechanical tree cutting would be used to establish tree groups, nonforested openings (interspaces), and move toward a balance of tree age and size classes. Prescribed fire would be used to reduce litter and other surface fuels, stimulate herbaceous understory vegetation, prepare sites for natural ponderosa pine regeneration, and

	catastrophic wildfire prevention. Namely: • Social acceptability of proposed treatments; • Speed of completion of landscape scale restoration; and, • Prioritization of treatments.	maintain interspaces. This alternative would partially address Issue 2, conservation of large trees, since mechanical treatments would be curtailed at 8-inch d.b.h. It would not achieve restoration desired conditions. It would resolve Issue 3, post-treatment canopy cover and landscape openness, since only small-diameter trees would be removed. However, approximately 73 percent of the 507,839 acres of ponderosa pine within the project area would not move toward forest structure and pattern desired conditions. Of all the even-aged stands, 47 percent (VSS 4), 8 percent (VSS 5), and 1 percent (VSS 6) would remain even-aged. There would be zero percent movement toward desired conditions in uneven-aged VSS 4 through VSS 6. For these reasons, this alternative was considered but eliminated from detailed study. The DEIS documents an alternative considered but eliminated from detailed study that would incorporate the 4FRI stakeholder group-created Large Tree Retention Strategy (LTRS, or also referred to as the Old Growth Protection and Large Tree Retention Strategy) as written. A modified version of the original strategy, the Large Tree Implementation Plan, or LTIP, was included in alternatives C and E. Table 15 in the DEIS displays a few excerpts from the original LTRS, the location of the excerpts in the LTRS, a crosswalk to the modified LTIP, and rationale why the original language was not accepted as written. For these reasons it was considered but eliminated from detailed study.
Martin, Tommie Cline	Alternative A, the no action alternative, does not offer the option of continuing an existing management approach to landscape scale forested ecosystems restoration in eastern Arizona inasmuch as there is currently no such approach. Alternative A would nonetheless result in the mechanical treatment of approximately 87,000 acres, and in the prescribed fire treatment of approximately 143,000 acres over the next five years (DEIS p. 62). However, the scale and pace of these management actions are incompatible with the urgent need to implement landscape scale restoration as identified in the purpose and needs for the 4FRI NEPA process. Therefore, Gila County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative A. Gila County understands the NEPA requirement for the 4FRI DEIS to analyze a no action alternative, and the County acknowledges and appreciates the existence of constituencies favoring no action. However, Gila County cannot support an	(163-36) Thank you for your comment.

Martin, Tommie Cline	alternative that would result in the continuation of an unmitigated high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Gila County is concerned that Alternative A is in direct conflict with the County's objectives as expressed in its plans and policies. Gila County regrets to suggest that there is no possible corrective action to mitigate the incompatibility of Alternative A with the County's objectives as expressed in its plans and policies, or to resolve or reduce the conflict between Alternative A and the County's objectives as expressed in its plans and policies. Alternative A is so departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Gila County's natural resources management objectives, that it does not warrant any further discussion from the County's perspective.	(163-37) Thank you for your comment. We agree that alternative A (no action) would not meet the purpose and need for landscape-scale restoration as described in the purpose and need (DEIS, pp. 8-29).
Martin, Tommie Cline	Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) both generally meet the purpose and needs of landscape scale restoration in eastern Arizona, as analyzed by the USFS 4FRI Team, and the County. For all practical purposes, Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) share many similarities: 1. The acreages treated, both mechanically and by fire-as-a-first-entry (approximately 388,000 acres treated mechanically and 588,000 treated with fire in Alternative B; and, approximately 434,000 acres treated mechanically and 593,000 treated with fire in Alternative C) are very similar; and, 2. The differences in acreage treated mostly result from the addition of grassland treatments to forestland treatments in Alternative C. Nonetheless, there are some differences between Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative): 1. The addition of grassland treatments to forestland treatments in the Preferred Alternative is significant inasmuch as it diversifies aptly the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape' restoration; 2. The increase in mechanical treatments upper limit	(163-38) Thank you for your comments. See the DEIS page 58 to 61 for more information regarding why the original large tree implementation strategy was modified. A modified large tree implementation plan was included in the DEIS in appendix D.

	from 16” to 18” diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) in the Preferred Alternative, while relatively minor from a treatments perspective, is likely to have an impact on the social acceptability of the proposed treatments; 3. The integration of some reworded components of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the Preferred Alternative is likely to have an impact on the social acceptability of the Preferred Alternative; and, 4. The integration of research projects in the Preferred Alternative is a welcome addition. Gila County clearly views the addition of grassland treatments to forestland treatments in Alternative C as a positive step toward meeting the County’s Rangelands Resources Management Objectives, and generally supports the integration of research projects into restoration implementation projects, wherever and whenever feasible. The County further supports the integration of stakeholders-developed strategies and foundational documents such as the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the 4FRI DEIS. Conversely, Gila County is concerned that the adaptation of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) into the USFS 4FRI Team Old Trees Implementation Plan (OTIP) and Large Trees Implementation Plan (LTIP) may have an impact on the social acceptability of the Preferred Alternative, as further discussed in the later sections Old Growth and Large Trees. Therefore, Gila County generally supports the concepts presented in Alternative C, the Preferred Alternative, provided that it is further refined per the suggestions offered in the County’s comments, as well as comments from other stakeholders critical to the viability of the 4FRI social license. However, Gila County is concerned that some decisions made by the USFS 4FRI Team may compromise the social license developed for the implementation of the 4FRI project. Consequently, Gila County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by some decisions made by the USFS 4FRI Team that may compromise the social license developed for the implementation of the 4FRI project, present a consistency gap between the 4FRI DEIS and the	
Martin, Tommie Cline		(163-39) Thank you for your comments.

Martin, Tommie Cline	County's objectives as expressed in its plans and policies and in these comments. Gila County respectfully suggests that the USFS 4FRI Team and the Responsible Officials exercise careful judgment in their decisions, in relation to: i) the true material importance of the issues, as opposed to their symbolic or emotional importance; and, ii) the potential effect of litigation on the implementation of the 4FRI project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' recommendations, and the major benefits attached to sustaining the 4FRI social license.	(163-40) Thank you for your suggestion. The Forest Supervisors will be reviewing all responses to the issues.
Martin, Tommie Cline	Alternative D is identical to Alternative B (the Proposed Action) as regards mechanical treatments. It is also identical to Alternative C (the Preferred Alternative) as regards mechanical treatments, except for the minor difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs). The critical difference between Alternative D and Alternatives B and C is the use of fire as a treatment. In alternative D fire would be used on only approximately 179,000 acres, compared to 588,000 acres in Alternative B and 593,000 acres in Alternative C. Gila County is concerned that the drastic reduction in the use of fire as a thinning treatment in Alternative D could prevent the timely completion of landscape scale restoration on the Mogollon Rim within the next 20 years as intended with the 4FRI project. The County favors, wherever and whenever possible, prioritizing forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona, with multiple industrial scale new investments. However, the County also recognizes that industry funded mechanical treatments may not be appropriate in many sensitive areas such as steep slopes, fragile soils, riparian areas, etc., or in areas where the merchantable yield of restoration treatments would be economically unviable. Further, Gila County acknowledges that agency funded mechanical treatments or hand thinning are disproportionately expensive as compared to fire	(163-41) Thank you for your comment. Please note alternative D was developed to respond to concerns people had with prescribed fire emissions. That is why the alternative would reduce the use of prescribed fire by about 69 percent when compared to alternatives B and C. Although the alternatives may appear to be the same (with the exception of the acres of prescribed fire), the effects in terms of creating a resilient forest is very different. In the FEIS, we have clarified the key ecological differences between the alternatives, see table 33 of the FEIS and chapter 3, environmental consequences.

Martin, Tommie Cline	thinning, and the County appreciates that, as discussed in a different context but still related to the implementation of 4FRI treatments in the Apache-Sitgreaves National Forests Land Management Plan PDEIS: “the alternatives were realistically designed to reflect anticipated budgets and workforce capabilities,” and “none of the alternatives would actually treat enough acres fast enough to fully reach desired conditions within the first 5 decades” (A/S PDEIS p. 440). The use of fire as a treatment tool is, therefore, not a luxury from a timeline, economic or practicality perspective, but is instead a necessity. Additionally, the County believes that the ecological role of fire is absolutely critical to the long term ecological sustainability of the forested ecosystems of the Southwest, and that a management alternative that would reduce unduly the use of fire could compromise, in the long term, the implementation of post-treatment maintenance burns. In consequence, Gila County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative D. Gila County understands the NEPA requirement for the 4FRI DEIS to analyze significantly different alternatives, and the County acknowledges and appreciates the existence of constituencies concerned with prescribed fire emissions, and who favor alternatives such as Alternative D. However, Gila County cannot support an alternative that could reduce the scope and significantly slow the pace of landscape scale restoration in eastern Arizona, which could result in the unnecessary prolongation of a high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Gila County is concerned that Alternative D is not compatible with the County’s objectives as expressed in its plans and policies. Gila County is concerned that there may not be a corrective action to mitigate the incompatibility of Alternative D with the County’s objectives as expressed in its plans and policies. Alternative D is too departed from the Mogollon Rim residents’ and visitors’ past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Gila County’s natural resources management objectives, to warrant further discussion from the County perspective.	(163-42) See the response to #163-41.

Notwithstanding any of the above, Gila County is concerned about the three action alternatives and the range of alternatives that they represent. Specifically, even though Gila County recognizes differences between the three action alternatives as discussed in the previous sections Alternatives B and C and Alternative D, the County is concerned that the mechanical treatments in each of the three action alternatives are similar enough in scale, scope and intensity that the DEIS may not offer an actual range of alternatives when discussing mechanical thinning. Arguably, the difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) is minor, and the addition of grassland treatments in Alternative C or the reduction of fire treatments in Alternative D do not affect forestland mechanical treatments per se. Gila County itself is generally satisfied with the mechanical treatments proposed in alternatives B, C and D, provided these treatments are refined to integrate the suggestions of the County and other stakeholders integral to the 4FRI social license. However, the County is concerned that the 4FRI DEIS could be perceived as a DEIS based on a single alternative of mechanical treatments, with non-significant variations between the three action alternatives. Therefore, Gila County is concerned that the 4FRI DEIS may fail to comply with the Council on Environmental Quality (CEQ) requirements to provide and analyze a range of alternatives (Sec. 1505.1 (e) and Sec. 1502.14 (a)) and that the absence of a broader range of analyzed mechanical treatments alternatives may present a process risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a broader range of analyzed mechanical treatments alternatives, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Martin, Tommie Cline

Martin, Tommie Cline

Gila County respectfully suggests that the USFS 4FRI Team request a third party legal review of the NEPA and CEQ requirements in, and of the 4FRI DEIS compliance with, Sec. 1505.1 (e) and Sec. 1502.14 (a).

(163-42) Thank you for your comment. The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act (40 CFR 1501.2(c)) . The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed (36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14). The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study.

(163-44) Thank you for your recommendation.

Martin, Tommie Cline	The degree of canopy openness in the immediate post-treatment conditions and in the long term desired future conditions has for several years been an issue of debate among the 4FRI stakeholders and the 4FRI collaborative group, including the USFS 4FRI Team, and is likely to remain one. This issue is linked to the discussion of whether vegetative structural stages (VSS) and canopy closure should be measured at group level, as proposed in the 4FRI DEIS, or at stand level, as currently implemented under the Coconino National Forest Plan. Amending the Forest Plan will resolve the technical compliance issue, but it does not address the more fundamental question of whether guidelines originally designed to be implemented at stand or even forest scale (outside Mexican Spotted Owl protected areas) are directly transferable, or not, to groups within stands. Additionally, the creation of interspaces between groups, in addition to the creation of regeneration openings within groups, will undoubtedly result in a significantly lower canopy density than was deemed desirable in the Management Recommendations for the Northern Goshawk in the Southwestern United States. Clearly, the USFS 4FRI Team has endeavored to be responsive to this concern, as evidenced in the 4FRI DEIS Appendix G Bridge Habitat, Appendix D Alternative B through D Implementation Plan, and in the silviculture Specialist Report. However, Gila County is concerned that the issues raised by partner agencies such as the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department, and by a broad range of stakeholders, have not yet been fully resolved. Questions remain about how and at what scale post-treatment canopy openness will be measured, and how group size, basal area (BA), stand density index (SDI), interspaces, regeneration openings, trees per acre (TPA), and quadratic mean diameter (QMD) interrelate to result in a trajectory toward desired future conditions. As previously noted, Gila County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Further, the County readily admits that it lacks the technical competence to contribute meaningfully to the resolution of arcane technical issues such as density management and the relationship between treatment intensity, tree group density, and overall average density, as relates to the	(163-45) Thank you for your comments. The issue of openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, "Interspace would occupy approximately 25 to 40 percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet." Table 118, on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. The implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example, pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the red zone density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the

implementation of post-treatment openness. Suffice it to say that the very fact that the discussion continues unabated is concern enough to the County that a zone of agreement has not been reached, or that the issues have not been understood clearly and broadly enough for the emergence of a general zone of agreement.

maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on

about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

Martin, Tommie Cline	Therefore, Gila County is concerned that the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, may be both a process risk and a social license risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk and social license risk for the 4FRI DEIS potentially caused by the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(163-46) Please see the response to #163-45. Regarding wildlife habitat, we have included a summary of post-treatment openness in chapter 2 of the FEIS (summary of effects table). Post-treatment openness, with a summary of effects, been provided for Mexican spotted owl and goshawk. Also see appendix G of the FEIS.
Martin, Tommie Cline	Gila County respectfully suggests the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting the science or, if science is lacking, the reasoning backing their decisions to transfer the canopy density guidelines originally designed to be implemented at stand or even forest scale, to groups; 2. Answering specifically the stakeholders' questions regarding the assumptions made in Appendix G Bridge Habitat (for example: percentage of openness at stand level including interspaces and regeneration opening; percentage of existing old growth in old growth allocations; relative higher density of canopy in MSO and goshawk habitats post plan amendments; etc.); 3. Providing qualitative and quantitative 'visual' descriptions of post treatment objectives, including relative proportions and actual sizes of groups, stands, openings, etc., for each treatment type; and, 4. Explaining clearly how openness will be measured post treatments, how it will be monitored, how the monitoring data will trigger adaptive management, and at what thresholds.	(163-47) Please see the response to #163-45.
Martin, Tommie Cline	As discussed above, and as analyzed in the 4FRI DEIS, forest plans amendments are technically required for 4FRI to be implemented under the current forest plans of the Coconino and Kaibab national forests. These amendments essentially address management actions (mechanical treatments up to 16" or 18" d.b.h., and low-intensity prescribed fire) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs); and (a) resolve the issues of desired percentage of interspace within uneven-aged stands; (b) add the interspace	(163-48) Thank you for your comments. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52 (DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was

distance between tree groups; and, (c) add language clarifying where canopy cover is and is not measured to facilitate restoration in goshawk habitat (excluding nest areas). The amendments also remove the cultural resource standard that requires achieving a "no effect" determination, and allow for a "no adverse effect" determination. The amendments further remove language referencing monitoring of Mexican Spotted Owl Protected Activity Centers (pre- and post-treatment, population, and habitat), and defer to the U.S. Fish and Wildlife Service the monitoring and design of the treatments in Mexican Spotted Owl protected habitats. Gila County understands the technical necessity of amending the forest plans and has no specific issue with the concept. However, the County is concerned about the decision of the USFS 4FRI Team to characterize the amendments as non-significant, and to defer 4FRI projects design and monitoring in Mexican Spotted Owl protected habitat to the U.S. Fish & Wildlife Service, without including the U.S. Fish & Wildlife Service monitoring plan and guidelines for projects design in the 4FRI DEIS. The Forest Service Manual provides guidance in Sec. 1926.52 Changes to the Land Management Plan That are Significant as follows: "2) Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period." In the USFS 4FRI Team's own analysis in Appendix B Forest Plan Amendments: "The canopy cover portion of the amendment would affect 139,308 acres (18 %) of all goshawk habitat on the Coconino NF and about 35 % of goshawk habitat within the project area" (DEIS p. 466); and: "The amendment would affect approximately 20 % of all suitable goshawk habitats on the forest and about 27 % of goshawk habitat within the project area" (DEIS p. 482). It is unclear to Gila County if there is an official percentage threshold for significance in the Forest Service regulations, but it seems that the common understanding of the word 'significant' - "a noticeably or measurably large amount" (Merriam Webster) - would include 35 % of goshawk habitat within the project area in the Coconino National Forest, or 27 % of goshawk habitat within the project area in the Kaibab National Forest. Citing these two percentages as precisely the reason why "For this reason, developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51). With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS

location and size (were) determined to be non-significant" (DEIS p. 466 and p.482) seems questionable, unless guided by an agency guideline, in which case a reference would be useful. Additionally, it is unclear how the canopy cover portion of the amendments would affect only 35 % and 27 % of goshawk habitat respectively, although the County speculates that it is related to higher vegetative structural classes (VSS). Further, Gila County is generally comfortable that habitat restoration and reduction of fire risk are key to improving Mexican Spotted Owl (MSO) habitat quality and, therefore, are aligned with both the current Coconino and Kaibab forest plans, as amended, and the U.S. Fish and Wildlife Service's (USFWS) revised MSO recovery plan (2012). However, the County is concerned that deference of treatments design to another agency (USFWS) without integrating this agency's proposed treatments, or at least guidelines, in the 4FRI DEIS makes it impossible for the 4FRI DEIS Team to analyze the site specific and the cumulative effects of the treatments. Therefore, Gila County is concerned that the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the inclusion of a USWFS monitoring plan or treatments guidelines, and without the possibility to analyze their effects in the 4FRI DEIS, may present a process risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the possibility to analyze their effects in 4FRI, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C) Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is

Martin, Tommie Cline	Gila County respectfully suggests that the USFS 4FRI Team request a third party legal review of the Forest Service Manual requirements in, and of the 4FRI DEIS compliance with, Sec. 1926.52 as relates to a determination of non-significance. Gila County further respectfully suggests that U.S. Fish and Wildlife Service monitoring plan and guidelines for the design of treatments in Mexican Spotted Owl protected habitats be incorporated into the 4FRI DEIS, and that their expected direct and indirect site specific effects be analyzed, presented, and integrated into the cumulative effects analysis.	affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS). (63-49) Thank you for your recommendation. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain

Martin, Tommie Cline	The adaptation of the stakeholders-developed single document Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) by the USFS 4FRI Team resulted in two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Large Trees Implementation Plan (LTIP) is discussed in the following section Large Trees. Clearly, the focus of the 4FRI stakeholders on old growth protection has been integrated by the USFS 4FRI Team in the 4FRI DEIS. Section C Old Trees Implementation Plan of Appendix D Alternative B through D Implementation Plan captures the essence of the stakeholders' old growth protection strategy: "Old trees would not be cut for forest health issues or to balance age or size class distributions" (DEIS p. 644). Gila County also observes that, as required in order to comply with the forest plans, old growth allocation in the 4FRI DEIS meets the 20% minimum requirement for vegetative structural stage (VSS) 6 Old Forest; and Appendix D Section B Decision Matrix for establishing tree groups, interspace, and regeneration openings, preserves trees with old tree characteristics. However, Gila County observes that, past the affirmative statements in the 4FRI DEIS, the actual field decisions are left open to individual judgment. While "human health and safety" (DEIS p. 644) should be a fairly objective criteria, "additional habitat degradation" may be more open to interpretation, as illustrated in Section C Old Trees Implementation Plan itself where the example of prevention of additional habitat degradation involves … road construction! Further, Gila County also observes that the 4FRI DEIS states that "most sites (allocated to old growth) currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans" (p. 15). Considering that the purpose of allocating acres to old growth forest is to manage these acres for the fastest possible growth of existing trees toward VSS 6, there is a high likelihood that mature large trees in VSS 5 may be thinned in order to reduce competition for VSS 6 candidates. This decision also involves personal interpretation and individual judgment calls which may prove socially acceptable or disastrous based on the individual making the decision. Therefore, Gila County is generally satisfied	Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. (163-50) Thank you for your comments. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention"□ (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range□." The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across

	with the Old Trees Implementation Plan (OTIP) and old growth management objectives stated in the 4FRI DEIS, but remains concerned that its implementation may be a social license risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by a misguided implementation of the Old Trees Implementation Plan (OTIP), may present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	the landscape including the large/old tree component. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Martin, Tommie Cline	Gila County respectfully suggests that the USFS 4FRI Team include strict and restrictive guidance regarding the possible removal of old growth, including a maximum number of trees removed according to appropriate metrics such as possibly: per 10 acre block, per mile, per project, or similar.	(163-51) Thank you for your suggestion. However, the intent of the project is to retain all pre-settlement trees unless there are public health and safety issues. See response to comment 163-49...
Martin, Tommie Cline	Large trees are particularly precious inasmuch as they represent the 'future old growth' necessary to restore the forests of eastern Arizona to an ecologically sustainable condition, and to provide habitat to dense and high canopy dependent species. The old growth 'allocation' requirement of 20% in the forest plan, as discussed in the previous section Old Growth, is a 'paper' allocation and should not be confused with the 'actual' old growth that exists in the lower single digit percentage across the forests, numerically far below the required 20% - or even 10% - and temporally far removed from reaching the required 20%. The deficit of actual vegetative structural stage (VSS) 6 Old Forest is what makes vegetative structural stage (VSS) 4 and 5 Mid-age Forest and Mature Forest important. This reasoning guided Gila County when it participated to the stakeholders development of the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) that the USFS 4FRI Team adapted into two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Old Trees Implementation Plan (LTIP) is discussed in the previous section	(163-52) The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape." Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be

Old Growth. The purpose of the stakeholders' large trees retention strategy is to emphasize the retention of large trees (VSS 4 and 5) in order to re-establish the old growth necessary for the ecological sustainability of eastern Arizona forests. However, the large trees retention strategy also includes a series of exception mechanisms that codify the socially acceptable removal of large trees (VSS 4 and 5) with a diameter superior to 16" at breast height (d.b.h.), when their removal is necessary to achieve the ecological restoration objective, to increase heterogeneity, and/or to conserve biodiversity. The stakeholders' document also includes provisions for collaborative adaptive management and collaborative participation to propose decision content, while complying with the statutory retention of the decision making authority by the Responsible Official. Gila County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) i) does not fully reflect the intent of the stakeholders; and, ii) does not take advantage of the products of the 4FRI collaboration. Specifically: 1. The Forest Service determined that: "The original LTRS did not provide the ability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings category" (DEIS p. 57). In so stating, the Forest Service apparently overlooks the fact that removal of individual large young trees is allowed under the exception mechanism, as required to meet the ecological restoration objective. The stakeholders' intent in constraining the removal of groups of large young trees is to allow the development of future old growth as required in the forest plans, including old growth groups. 2. The Forest Service further determined that: "this would result in a continued imbalance of size classes that would be contrary to the forest plan desired conditions" (DEIS p. 57). In so stating, the Forest Service fails to capitalize on the fact that the 4FRI DEIS already includes several forest plans amendments and that these amendments can address this issue as well. Further, the USFS 4FRI Team does not disclose at what scale the imbalance would occur. Imbalance at group level, or even possibly at stand level, becomes balance at larger scales as groups of VSS 5 future old growth balance large areas devoid of them. 3. The Forest

managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component"□. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. See our previous response regarding the large tree retention strategy and alternatives considered but eliminated that addressed diameter limitations as a means to conserve large trees.

	Service also determined that: “The original LTRS would have required the Forest Service to consult with stakeholders should a new exception category be found during implementation (LTRS, page 25). To resolve the potential for Federal Advisory Committee Act (FACA) violations, this consultation requirement was removed” (DEIS p. 57). In so stating, the Forest Service misses an opportunity to take advantage of the MOU signed between the USFS and the stakeholders to address specifically such issues through collaboration in compliance with FACA. Therefore, Gila County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) is likely to be a significant social license risk for the 4FRI DEIS, and that the risk / benefits analysis of the social license risk vs. the restoration benefits may be unfavorable to 4FRI. Consequently, Gila County is concerned that the social license risk for the 4FRI DEIS likely caused by the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP), presents a consistency gap between the 4FRI DEIS and the County’s objectives as expressed in its plans and policies and in these comments. Gila County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2. Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during	
Martin, Tommie Cline	implementation; and, 3. Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale analysis not address the issue of continued imbalance of size classes.	(163-53) See previous responses.
Martin, Tommie Cline	Gila County observes that there are only a mere 5 instances of the word “prioritization” in the 744 page 4FRI DEIS. The County further observes that none of these instances apply to the discussion of the concept of treatments prioritization, for the obvious reason that there is no discussion of treatments prioritization in the 4FRI DEIS,	(163-54) Recommendations that included sequencing were categorized as outside the scope of this analysis. The disclosure of sequencing within a NEPA document would be problematic because it would bind the Agency to a fixed schedule that may be unattainable due to weather, fires, markets, or other unforeseen circumstances. It would

including in Appendix D Alternative B through D Implementation Plan, or in the specialist reports or in the project record. Gila County also observes that Appendix D Alternative B through D Implementation Plan contains no discussion of timing or sequencing of treatments and that the concept of 'Implementation Plan' seems interpreted in the 4FRI DEIS as 'guidelines to implement' rather than 'action plan to implement' or 'work plan to implement.' The County certainly realizes that minute details of implementation are not a NEPA concern but a contracting management concern. However, the County also posits that the implementation of a management action as far reaching in scope and temporal and geographical scale as 4FRI, requires a discussion of timing and sequencing, inasmuch as timing and sequencing of treatments are of a nature to potentially impact significantly the site specific effects of individual treatments and the collective cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects). Further, the concept of 'Strategic Placement' of the treatments, in relation to values to be protected, dominant winds, modeled fire behaviors, etc., is critical in the determination of what treatments are most appropriate, how many treatments are required, what treatment intensities are required, and what is the best distribution between treatment types (mechanical vs. fire). The 4FRI stakeholders worked extensively to produce the Landscape Restoration Strategy for the First Analysis Area (2010) that addressed in detail the concept of geographical and temporal prioritization. This work was further refined with the participation of the USFS 4FRI Team into a classification of High Resource Values (HRVs) and Medium Resource Values (MRVs). Some elements of this work were utilized by the USFS 4FRI Team in the 4FRI analysis process, but the discussion of strategic placement; geographical and temporal prioritization; and, their impact on: number, type, intensity, individual and cumulated effects of treatments, is missing. Gila County is not inferring the need to re-analyze the location of the treatments. The County is generally satisfied with the map of treatments location. However, because the timely implementation of the restoration treatments is critical to meeting the purpose and

likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS does not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation is most appropriately addressed in implementation and operations. Recommendations that included strategic placement of treatments were categorized as being outside the scope of the analysis and not in alignment with the purpose and need for the project. Treating only strategic locations is a strategy used for hazardous fuels treatments when the primary objective is to modify fire behavior and to reduce high severity fire effects. In ponderosa pine, there is an overlap between hazardous fuel treatments and restoration treatments because restoring ponderosa pine forests generally results in reducing the severity of potential fire effects. Fuel treatments can include such strategies as thinning from below or leaving a minimum distance between tree crowns or boles. Neither of these would put a ponderosa pine forest on a trajectory towards health and resilience. The treatments displayed in the DEIS (alternative C, preferred alternative) and FEIS are designed to put the landscape on a trajectory towards the desired condition by treating the entire landscape, not just "strategically" placed treatments. Additionally, on a landscape the size of the 4FRI, it would be a gamble to guess where a fire might start, and the variables would be too numerous to make such an assessment valid.

needs of the proposed action, the County is concerned that the spatial and temporal sequencing of the treatments may have a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Therefore, the absence in the 4FRI DEIS of spatial and temporal strategic timing and sequencing of the treatments, and integration of the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI EIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a discussion of strategic placement, spatial and temporal prioritization, and their influence on the number, type, intensity, and individual and cumulated effects of treatments, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Gila County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting a temporal prioritization of the treatments and a sequenced timeline of implementation for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; 2. Presenting a spatial prioritization of the treatments and the sequenced locations of the treatments, for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; and, 3. Presenting how the temporal and spatial prioritization affect the number of treatments, type of treatments, intensity of treatments, direct, indirect, site specific, and cumulated effects of the treatments

Martin, Tommie Cline

Fire behavior modeling is a critical part of the 4FRI site specific and cumulative analysis process, and Gila County appreciates the fact that a major effort was made along the entire 4FRI analysis process, starting well before the DEIS, or even the Proposed Action, to model the cumulative effects of landscape scale restoration treatments on fire behavior. To the County, post-treatments and long term future desired conditions fire behaviors represent much of the 'end game' in 4FRI, as the restoration of a natural regime of regular cool surface fires is fundamental to the long term ecological sustainability of the forests of eastern Arizona. Probably as a consequence of the fact

Martin, Tommie Cline

(163-55) See previous responses. We recommend the counties continue to work with the forests and the monitoring and adaptive management group during implementation.

(163-56) Page 15 to page 25 of the fire ecology report prepared for the DEIS outlines methodology and modeling used to support the fire analysis. For example, the fire report states, "Fire behavior for existing conditions was modeled for the project area using default Landfire Refresh 08 data. Results were reviewed by local fire experts (district, forest, National Park Service and non-federal firefighters and managers), and adjustments made to improve model accuracy. The process was repeated to further improve results. Fire behavior for post-treatment conditions was modeled using FlamMap and a combination of Landfire Refresh 2008 data and FVS-FFE data (LANDFIRE 2010a,

that the 4FRI DEIS does not include a specific treatments implementation plan including timing, prioritization and sequencing of treatments in Appendix D Alternative B through D Implementation Plan (see section Prioritization here above), the fire behavior modeling in the 4FRI DEIS only provides a theoretical modeling based on the unrealistic premise that all treatments would happen simultaneously. This is unfortunate because the fire behavior modeling cannot include accurate canopy characteristics (base height, bulk density and cover) or surface fuel loading for any given large area at any given point in time as a result of some treatments being implemented; some treatments not being implemented yet, with fuel load further increasing and canopy characteristics further degrading; and, some treatments having been implemented, possibly as earlier as a decade earlier, with canopy and fuel loading characteristics at various stages of regrowth. Accordingly, Gila County is concerned that post-treatment fire behavior as modeled may not represent reality, and that the analysis of the cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects) may be tainted. Therefore, Gila County is concerned that the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, due to the lack of timing and sequencing of the treatments, may present a process risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

LANDFIRE2010b). Post-treatment canopy characteristics and fuel loading were determined using the Fire and Fuels Extension (FFE) (Reinhardt and Crookston 2003) to the Forest Vegetation Simulator, FVS (Dixon 2002). In fire modeling, outputs (such as fire type and fireline intensity) are determined, in part, by the fuel models used. Post treatment fuel models need to take into account changes in total fuel loading and fuel structure. Landfire data must be manipulated to produce post-treatment conditions for fire modeling, so outputs from FFE were used to develop post-treatment fuel models. The modeled post-treatment fire behavior data are the result of combined stand data from the Forest Vegetation Simulator (FVS) and Landfire Refresh 2008 data. Post-treatment fire type was modeled by using outputs from FVS-FFE to adjust the percent of change to canopy characteristics and surface fuel loading and to inform the assignation of post-treatment fuel models. Details of the process for assigning post-treatment fuel models for modeling fire type is included in Appendix D. FVS outputs used were stand averages that were used to give a general idea of what stand conditions would look like, but could not address the spatial distribution of specific metrics on the same scale as the Landfire data. Landfire/FlamMap data are gridded (raster) data, with a resolution of 30 meters. FVS/FFE data is vector based, with smallest units being the size of individual stands. The 'hills and valleys' of the stand characteristics were smoothed out when the stand data were averaged, resulting in the fire behavior also being 'smoothed out' somewhat. A stand is 'typed' as a single vegetation type, though it may have a mix, for example, of pine forest and grassy openings. Habitat types (e.g. core areas, restricted habitat, etc.) were classified at the stand level to facilitate silvicultural analysis. Fire behavior was modeled at the 30 meter scale. The resolution for modeled fire behavior is 30 meters". The cumulative effects analysis for all alternatives is located on pages 227 to 249. A page 18-23 of the fire ecology report specifically discusses methodology for evaluating canopy characteristics and fuel loading. Pages 23 to 25 display data sources and models. Appendix D of the fire ecology report (pp. 283-321) is titled, "Descriptions of models and processes used in fire modeling". Appendix D not only includes information on how the model was used but also discusses limitations associated with specific models.

Martin, Tommie Cline	Gila County respectfully suggests that subsequent to the completion of an analysis presenting a temporal and spatial prioritization of the treatments, the USFS 4FRI Team provide a clear and compelling analysis of the effects of the treatments on fire behavior, presenting annual or bi-annual fire behavior modeling based on the outcome of the progressive implementation of 30,000 acres of restoration treatments annually over the 10 year life of the 4FRI project, and that the impact of this analysis be integrated in the analysis of the number, type and intensity of treatments required to meet the purpose and needs, and the direct, indirect, site specific, and cumulated effects of the treatments.	(163-57) Please see previous responses concerning prioritization and fire modeling. In summary, It is not feasible to segment the NEPA analysis based on arbitrary prioritization assumptions that may or may not occur.
Martin, Tommie Cline	The ponderosa pine vegetation type in the 4FRI DEIS analysis area is dominated by Class 2 functional at-risk 6th level Hydrologic Unit Code (HUC) watersheds on about 451,500 acres or 46 % of the analysis area. Class 3 impaired watersheds represent about 316,800 acres, or about 32 % of the analysis area. Class 1 properly functioning watersheds represent about 220,400 acres, or about 22 % of the analysis area (DEIS p. 107). Per the Specialist report, and as summarized in the 4FRI DEIS, the 4FRI restoration treatments under Alternative B (the Proposed Action) and Alternative C (the Preferred Alternative) are expected to result in an improvement in 23% of Class 2 functioning at-risk watersheds (~104,000 acres), and 42% of Class 3 impaired watersheds (~133,000 acres), with 28 miles of improved water flow regimes overall, including 19 miles in Class 2 watersheds that are functioning at risk and 9 miles in Class 3 watersheds currently impaired (DEIS p. 114). Gila County is generally satisfied that the effects of the 4FRI restoration treatments under Alternative B and Alternative C contribute significantly toward the County's objectives as expressed in its plans and policies and in these comments.	(163-58) Thank you for your comment.
Martin, Tommie Cline	Gila County encourages the USFS 4FRI Team to prioritize wherever and whenever possible restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures. Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS	(163-59) See our previous response. Treatments in at-risk watersheds are a high priority.
Martin, Tommie	During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders	(163-60) During this process (from scoping to DEIS to FEIS), no one has asked for the complete project record, including ECO. Throughout this

Cline	Group, and the associated work with the USFS 4FRI Team, Gila County observed that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Additionally, the site specificity verification process revealed that some of the required Geographic Information System (GIS) data tables or layers were not entered into the official project record. Therefore, Gila County is concerned that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data and may present a process risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Gila County respectfully suggests that the USFS 4FRI Team conduct a systemic and systematic review of all technical data, GIS or other, used in their analysis, and ensures that it is included in the 4FRI project record. The County further suggests that the USFS 4FRI Team	entire process, we have openly shared our GIS data. It appears to have been usable to those with geospatial technology skills for a particular resource such as wildlife, silviculture and fire. We believe the project record, including all supporting data, has been included. We would welcome you pointing out to us what supporting data or information is missing in our project record.
Martin, Tommie Cline	use the same methodology of random sampling as used by the DEIS Review Workgroup of the 4FRI Stakeholders Group to statistically verify that all required data is included in the project record. During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Gila County verified to its satisfaction that the required site specificity as regards current condition, desired future condition, prescribed treatment, and site specific effects has been provided in the USFS 4FRI Team analysis process. However, as stated in the above section Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS, the site specificity verification process with the USFS 4FRI Team evidenced to both the County and the USFS 4FRI	(163-61) Please see our response to #163-60. (163-62) Regarding site specificity, the DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific
Martin, Tommie Cline	Team that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Therefore, Gila	

County is concerned that the difficulty to access site specificity information may present a process risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the difficulty to access site specificity information, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions" (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-

specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601). The site-specificity of the analysis was tested by the 4FRI stakeholder group. In response to comments on the DEIS, the stakeholder's wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue (4FRI Stakeholder, 2013 Cara Letter #155). See our previous responses which address the inclusiveness of project record documentation.

Martin, Tommie Cline	As discussed by the Eastern Arizona Counties Organization with the USFS 4FRI Team, Gila County respectfully suggests that the interactive map presented on the 4FRI DEIS website be developed to allow easy 'point and click' access to site specific information such as, but not limited to, current condition, desired future condition, prescribed treatment, site specific direct and indirect effects, and contribution to cumulative effects, as well as all the technical information regarding all relevant resources as can be conveniently provided. Alternatively, if technical or resource constraints preclude the USFS 4FRI Team to develop the above suggested interactive map, or to make it available to the public, Gila County respectfully suggests that a 'point and click' function could provide information on how to procure the desired site specific data from the project record.	(163-63) The interactive map is designed to provide people with an alternative method of reviewing maps and alternatives than the traditional poster-sized hard copy. People may still review the project record index and request documents (if not considered to be sensitive information, such has heritage site locations).
Martin, Tommie Cline	Appendix F Cumulative Effects includes a comprehensive list of the past, current and reasonably foreseeable future projects and disturbances included in the cumulative analysis. These projects and disturbances include vegetation projects (mechanical thinning and	(163-64) Thank you for your comment. For past actions, the cumulative effects analysis must be consistent with 36 CFR 220.4(f). This regulation incorporates direction from 40 CFR 1508.7 and The Council on Environmental Quality Guidance Memorandum on Consideration of

prescribed fires); recreation projects; other projects; wildfires; insect and disease outbreaks; and, a short discussion of reasonably foreseeable projects with insufficient information for analysis. The list includes projects located on private, State, national forests and other federally managed lands that lie within, adjacent to and outside of the project area. Appendix F Cumulative Effects does not include a discussion of what the cumulative effects of all the projects are, and only includes a brief synopsis of Authorized Livestock Management; Timber Harvest; and, Post-1996 Vegetation Treatments – Uneven-aged Management, Fire Risk, Restoration, summarized from the Specialists' reports. Chapter 3 Affected Environment and Environmental Consequences addresses extensively the concept of cumulative effects on Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; and, Transportation. However, the format used to discuss the cumulative effects varies considerably from resource to resource. For example, the Soils and Watershed (DEIS p.105-121) and the Terrestrial and Semiaquatic Wildlife and Plants (DEIS p.173-245) sections include fairly comprehensive descriptions of the cumulative effects and of their rationale. Other sections formulate cumulative effects as opinions, or as summary statements that essentially posit that the past or current projects have achieved or are achieving their stated objectives.

The Cumulative Effects section itself of Chapter 3 is but a two sentence paragraph that states: "A summary of past, present, and reasonably foreseeable management actions and natural disturbances that were evaluated by most resources is located in appendix F. See the project record for the comprehensive master list of all projects and for additional information on each project" (DEIS p. 331). Gila County is generally satisfied that the list of projects considered in the cumulative effect analysis is appropriate, with one notable exception. Since the completion of the 4FRI DEIS, the Flagstaff Watershed Protection Project Proposed Action (PA) has been released (April 2013) and will need to be integrated into the

Past Actions in Cumulative Effects Analysis (June 24, 2005). FSH 1909.15.3 provides specific direction on determining the spatial and temporal boundaries, two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial boundaries define the affected area for each resource indicator. Affected areas can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. "For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political" (FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose. Regarding the content of the cumulative effects analysis, please see our response to comment #163-63.

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(163-65) Chapter 2 of the FEIS notes that 4FRI treatment acres overlapping with the Flagstaff Watershed Protection Project have been removed from the 4FRI FEIS analysis. See our response to comment #163-63 and #163-64 for a general discussion on cumulative effects.

	cumulative analysis in the final EIS	
Martin, Tommie Cline	Gila County is generally satisfied that the resource specialists have conducted some form of cumulative effects analysis, and the County realizes that the cumulative effect analysis methodology cannot be identical across resources. However, the County is concerned that the methodologies for cumulative effects analysis are generally not satisfactorily explained, and may be inconsistent in depth and breadth across resources. The County is further concerned that the issue of continuity between the project record, the specialists reports, and the DEIS - already identified regarding site specific effects -may also exist regarding cumulative effects. Therefore, Gila County is concerned that potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis may present a process risk for the 4FRI DEIS. Consequently, Gila County is concerned that the possible process risk for the 4FRI DEIS potentially caused by potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(163-66) See previous responses.
Martin, Tommie Cline	Gila County respectfully suggests that the USFS 4FRI Team include the Flagstaff Watershed Protection Project Proposed Action (April 2013) in the cumulative analysis in the final EIS. Gila County further respectfully suggests that each resource section of Chapter 3 Affected Environment and Environmental Consequences include a methodology subsection describing the methodology used for cumulative effects analysis. The County also suggests that the USFS 4FRI Team review methodologies across resources to ensure consistency of depth and breadth of cumulative effects analysis.	(163-67) Please see previous responses.
Martin, Tommie Cline	Appendix E Alternative B through D Monitoring and Adaptive Management Plan offers brief one or two sentence descriptions of: types of monitoring (ecological, implementation, effectiveness, validation and Collaborative Forest Landscape Restoration Act (CFLRA)); monitoring prioritization, scales, question and indicators; and, a ten line description of adaptive management. Appendix E also includes Table 143 Implementation monitoring questions, indicators,	(163-68) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to

frequency of measurement, data source, and cost; Table 144 Landscape-scale effectiveness desired conditions, indicators, frequency of measurement, data source, and cost; and, Table 145 Effectiveness monitoring plan. However, Gila County observes that about half of Table 143 Implementation Monitoring is left blank, and for most questions for which the table is not blank, the indicators are crude and the frequency is minimal (typically: annual acres and miles). Table 143 looks more like an annual budgetary reporting table than a project implementation monitoring plan. The quantitative aspect of implementation monitoring seems addressed but the qualitative aspect of implementation monitoring seems largely unaddressed or unanswered. It is surprising that half the table is incomplete, indicating an unfinished product. Gila County also observes that Table 142 Monitoring scales, is left incomplete inasmuch as it does not include any monitoring scale below the sub-unit for the 4FRI DEIS. This, too, indicates an unfinished product. Further, there appears to be a gap in the effectiveness monitoring plan inasmuch as most of the treatments focus on achieving treatments objectives and desired conditions at the stand or even group level, while most of the effectiveness monitoring appears to be planned at the landscape scale. Gila County further observes that Table 144 Landscape-scale Effectiveness offers a fairly comprehensive list of desired future conditions: Conservation of Biological Diversity; Ecosystem Resilience; Water and Air Resources; Economics; Social Systems; and, Heritage Resources. However, the indicators listed are macro level indicators and the frequency of measurement is generally annually or every 5 years, and many sections of the table in the “Data Source/Spatial Scale/Cost” column indicate “No numbers provided.” This further indicates an unfinished product.

manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. County comments imply the need for a supplemental EIS because the monitoring plan was not complete. In response to comments on the DEIS an agency may: (1) Modify alternatives including the proposed action, (2) Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan. As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the Adaptive Management section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship

contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in how the plan questions and indicators are organized and change section name to "Monitoring: Desired Conditions, Indicators, Thresholds and Triggers", (6) Modified the "Monitoring Prioritization" section to reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and changed section name to "Prioritization - Monitoring Tiers"; and (7) Modified the "Monitoring Scale" section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix B) informed people that the monitoring plan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species" section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation" section) and the development of the implementation plan (appendix D).

Martin, Tommie Cline	Gila County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more of an adaptive management decision matrix than an effectiveness monitoring plan. Adaptive management is addressed in the following section Adaptive Management.	(163-69) Thank you for your comment. Please see our response to #163-68 which provides a summary of all updates to the plan between DEIS and FEIS.
Martin, Tommie Cline	Gila County is concerned that the 4FRI DEIS, the Specialists reports and the project record do not include a specific 'action plan' or 'work plan' and budget, or funding mechanisms, for the monitoring plan. Although the question of who will monitor, and potential funding sources, are nominally mentioned in Table 141 Monitoring plan tiers, the scale, scope and complexity of 4FRI require addressing these questions in a comprehensive fashion that goes well beyond a passing mention in Table 141. How many man-hours will the implementation of the monitoring plan require? Who will provide these man-hours? How much will it cost? How will it be funded? What are the quality control mechanisms to ensure that monitoring	(163-70) Thank you for your comment. A project work plan is developed each year once the Agency receives its budget as appropriated by Congress. Once the annual budget is available, the Forest Service will work with the Multi-Party Monitoring Board to prioritize monitoring activities. All of these questions will be answered in collaboration with the Multi-Party Monitoring Board as set forth in the collaboratively developed AMMP. These determinations cannot be made until we know more about the available annual budget, the funds that can be leveraged by partners, and the specific monitoring protocols developed by the Forest Service and the monitoring board. The Forest Service will continue to consider new peer-reviewed science as it becomes

itself - if provided by volunteer (amateur?) third parties - meets required criteria? What mechanisms exist to ensure the integrity of the measures? Further, the reliance on “stakeholders” and “multiparty (monitoring boards)” in the 4FRI DEIS monitoring plan tiers (Table 141, DEIS p. 660) raises questions which are left unanswered regarding the functioning of the monitoring plan. For example: What is the USFS mechanism to utilize third party developed monitoring data to make agency action adaptive management decisions? What are the mechanisms to deal with adaptive management decisions that may be of a nature to significantly alter the management actions identified in the Record of Decision? Etc.

Gila County is further concerned that the ability of the public to review and comment on the 4FRI monitoring ‘action plan’ or ‘work plan’ and budget has been compromised inasmuch as even if the USFS 4FRI Team develops such a plan and budget as an outcome of the comments process, the plan will not be available for public review and comments until a notice of decision is published, unless the USFS 4FRI Team decides to release a second 4FRI Draft EIS (DEIS) or a Supplemental EIS (SEIS). Considering that the 4FRI monitoring ‘action plan’ or ‘work plan’ and budget currently do not exist, it is not possible to submit substantive comments on them and, therefore, a potential objection could be ineligible based on 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments.

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available. The collection of monitoring data through a third party would be coordinated by the multi-party monitoring board in collaboration with the Forest Service. Once the data is delivered, it will be verified and evaluated through by an interdisciplinary team of resource specialists. The results of the evaluation and the implications of potential adaptive management actions will be provided to the deciding official for a final decision. If monitoring indicates that the environmental effects of each action do not exceed the bounds of those disclosed in the environmental document, and the actions serve to move the project towards the desired conditions, the Forest service can continue implementation as described without the need for new or supplemental NEPA review (FSH 1909.15, 54.1). However, if monitoring indicates that the project is not moving towards the desired condition, the Forest Service will first evaluate design adjustments within the bounds of the management actions already disclosed and analyzed in the environmental document. For example, if the Forest Service were modifying the vegetation within an area according to treatment type UEA25, we may reduce the area occupied by interspace to 25 percent; rather than the maximum allowable of 40 percent. In both cases, the treatment type is the same, but the design change may better move the projects towards the desired condition. "In the case that new information or changed circumstances result in environmental impacts of a proposed action not disclosed or analyzed, further interdisciplinary review should occur as described in section 18"□ (FSH 1909.15, 54.1). (163-71) Thank you for your comments; they have been noted. See previous responses on budget and responses on the completeness of the information provided to the public in the DEIS on monitoring. The monitoring and adaptive management plan was developed in collaboration with stakeholders. Enough information was provided in the DEIS (DEIS Appendix E) to inform the public. Sufficient information was included because many comments were received on the plan, including the need to incorporate the MSO monitoring plan. That document was unavailable at the time the DEIS was released for public comment because it was derived from the FWS biological opinion. However, 36 CFR 218.8 does address new information that was provided to the public after a comment period has been provided, "(c) Issues raised in objections must be based on previously submitted

Martinez, Frederick	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this	Thank you for your comment. Please see our response to Letter #19.

specific written comments regarding the proposed project or activity and attributed to the objector, unless the issue is based on new information that arose after the opportunities for comment". While there have been updates to the analysis since the DEIS was made available for public comment, the changes from DEIS to FEIS are insignificant or in response to public comments on the DEIS (allowed by CEQ). There is no need for a supplemental DEIS.

	document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Martyn Goforth, Kathleen	The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. The EPA recognizes the Forest Service's commitment, demonstrated in the Four-Forest Restoration Initiative (4FRI or Project) DEIS, to restoration activities within the Coconino and Kaibab National Forests. We also acknowledge the Forest Service's dedication to public outreach and collaboration during the 4FRI NEPA process, and the efforts made to incorporate the best available science into the DEIS. In particular, we appreciate the 4FRI team taking Jason Gerdes, of my staff, on a site visit of the 4FRI planning area, and working with Jason and EPA Region VIII's Richard Graham to include information in the DEIS on the potential for smoke from the proposed prescribed fire treatments to contain radioactive substances.	(71-1) Thank you for your comment and providing access to the Agency's experts as we worked to resolve issues related to smoke emissions.
Martyn Goforth, Kathleen	Based on our review of the subject DEIS, we have rated the Preferred Alternative and the document as L0-1, Lack of Objections-Adequate (see enclosed EPA Rating Definition). The EPA acknowledges the need for the use of mechanical thinning and prescribed fire to achieve long-term restoration objectives. We commend the Forest Service for committing, in the Preferred Alternative, to strong best management practices and soil and water conservation practices to protect sensitive resources during mechanical harvest and fire treatments.	(71-2) It will be noted that the EPA has rated the preferred alternative as LO-1, Lack of Objections-Adequate.
Martyn	We recognize the challenge the Forest Service faces in implementing	(71-3) Thank you for your recommendation. In response to comments

Goforth, Kathleen	a restoration project that will rely heavily on prescribed bums and wildfire to achieve Project objectives. The "Fire Ecology Report" that the Forest Service prepared for this Project explains these challenges well. Although the planning area has good air quality and meets all federal ambient air quality standards, the fine particulate matter generated during wildland fire does present a human health risk. We recommend that the Forest Service work with the interagency Smoke Management Group and commit, in the Final EIS and Record of Decision, to implement best management practices to reduce emissions from prescribed burns and wildfires to the greatest possible extent. We also recommend that the Forest Service analyze and include a description, in the FEIS, of the potential for further reductions in air emissions from future forest treatments by lessening or eliminating pile burning of residual fuels in favor of biomass energy production.	on the DEIS, we have clarified that mitigation and design features would be used to reduce emissions from prescribed fire including:(1) Reducing the emissions produced for a given area treated, (2) Redistributing/ diluting the emissions through meteorological scheduling and by coordinating with other burners in the airshed. Dilution involves controlling the rate of emissions or scheduling for dispersion to assure tolerable concentrations of smoke in designated areas, and (3) Avoidance uses meteorological conditions when scheduling burning in order to avoid incursions of wildland fire smoke into smoke sensitive areas (web-based DEIS, FE9, page 570). Prescribed fire (pile, broadcast, and jackpot burning) would occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. Coordination with ADEQ would take place through the Kaibab and Coconino NF Zone Dispatch Center and the prescribed fire Burn Boss (web-based DEIS, FE2, page 568). Emission reduction techniques (ERTs) that are recommended by Arizona ADEQ would be utilized when possible to minimize impacts to sensitive receptors (including communities) of burn unit(s) (web-based DEIS, FE3, page 568). The following ERTs would be used when practicable to minimize impacts to sensitive receptors: pre-burn fuel removal, mechanical processing, increased burning frequency, aerial/mass ignition, high moisture in large fuels, rapid mop up, air curtain incinerators, burn before greenup, backing fire, maintain fire line intensity, underburn before litterfall, isolating fuels, concentrating fuels, mosaic/jackpot burning, moist litter and duff, burn before large activity fuels cure, and utilize piles (web-based DEIS, FE8, page 569). In addition to prescribed fire, the 4FRI is proposing over 388,000 acres of mechanical treatments (web-based DEIS page 40). On the majority of these acres, there would be little slash available for burning which means reduced emissions. Appendix C of the FEIS contains the project design features, best management practices, and mitigation measures that will be employed during implementation of the 4FRI treatments. The Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan (appendix E) in the FEIS has been expanded and contains specific language addressing how the preferred alternative will help build the resilience of the ponderosa pine ecosystem to the predicted effects of climate change. Pile burning would only occur after the initial entry as subsequent burns would be

		for maintenance and include broadcast burns. The Fire Ecology report for the FEIS has been updated and states for alternative C, "However, after the first entry burn, fuel loads would be significantly decreased, so potential tons/acre of emissions would be significantly lower. Additionally, because of the decrease in fuels, fire behavior potential would also be significantly lower (Table 134), so there would be more potential to burn on days with better smoke dispersal (higher winds and more lift) (FEIS Fire Ecology Report, page 278).
Martyn Goforth, Kathleen	The DEIS includes a detailed and thorough description of the possible effects of climate change on the Project, and is strengthened by incorporating elements of two good planning documents: the "Kaibab National Forest's Climate Change Approach for Plan Revision," and the "Southwestern Region Climate Change Trends and Forest Planning." We recommend that the Project's adaptive management plan include a commitment to monitor, mitigate, and respond to, the effects of climate change throughout the life of the 4FRI.	(71-4) Thank you for your support in terms of the approach taken to use monitoring and adaptive management in the most effective manner possible.
Martyn Goforth, Kathleen	We appreciate the opportunity to review this DEIS, and are available to discuss our comments. When the Final EIS is released, please send one CD copy to this office. If you have any questions, please contact me at 415-972-3521, or contact Jason, the lead reviewer for this project. Jason can be reached at 415-947-4221 or gerdes.jason@epa.gov.	(71-5) A CD with the FEIS will be mailed to the address on record for Region IX of the EPA. A hard copy packet of alternative maps will also be sent to facilitate your review.
McCreary, R Bruce	This program is based on the naive premise that fire is natural, thus fire should be used as the primary means of forest management. We don't have that natural world any more, and we have to be thinking now about CO2 management.	(88-1) Thank you for your comment. Much of the ponderosa pine ecosystem in the 4FRI analysis area is at risk from high severity fire (crown fire). From the fire ecologist's report: Air quality effects from large, high severity fires usually creates more emissions over a longer time than prescribed burning, because of differences in the size and duration of the fires (Hardy et al. 2001c pg. 93) and the amount of fuel consumed. (88-2) Thank you for your comment. Restoring the natural fire regime to the ponderosa pine ecosystem will reduce the risk of high-severity wildfires. From the fire ecologist's report: "Air quality effects from large, high severity fires usually creates more emissions over a longer time than prescribed burning, because of differences in the size and duration of the fires and the amount of fuel consumed."
McCreary, R Bruce	Instead, we should be looking at the CO2 impact of such a program, and create jobs in doing forest management by USING those renewable fuels, while protecting air quality and public health.	
McCreary,	I'm all for well managed cutting and thinning that removes slash	(88-3) Thank you for your comment.

R Bruce	from the forest, and creates fire breaks. It's nuts to sell logging rights while not requiring removal of slash, then using tax money to burn the slash. But that's what's happening here in AZ. Goats love undergrowth and have been used successfully for it's management in many states. Somehow introducing managed goat grazing is considered more dangerous than burning.	
McCreary, R Bruce	This program is a hazard to public health, a threat to the environment and a waste of renewable fuels and a waste of potential jobs in fuel collection and brush grazing management. It should be stopped and an intelligent plan demanded in it's place.	(88-4) Thank you for your comment.
McCreary, R Bruce	I have multiple autoimmune diseases including MS that are profoundly affected by smoke and this program is a direct threat to my health. Burning should not be the primary means of forest management.	(88-5) Thank you for your comment. Prescribed burning is just one component of the restoration activities that 4FRI plans to implement. The ponderosa pine ecosystem evolved with low severity fires occurring every few years and one goal of this project is to restore the forest so as to reduce the likelihood of high-severity fires that emit far more smoke than regulated prescribed fires.
McCreary, R Bruce	Rural Arizonans would be very glad for jobs in forest management by other means than burning, instead of unemployment handouts and welfare.	(88-6) Thank you for your comment. Please see pages 275-280 of the DEIS for information concerning the socio-economic impact of the 4FRI project.
Mccrohan, Shawn	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. I am a tour operator based in Phoenix. My company brings visitors throughout Arizona and specifically through the Four Forests. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs.	(29-1) Thank you for your interest in this project.
Mccrohan, Shawn	While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of	Thank you for your comment. Please see our response to Letter #19.

wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

McGuire, Tom

Dear Sir, I have a few comments on the 4-Forest Restoration Initiative. Please remember these), are Public Lands. I don't think closing roads will do much to restore the forest ,unless your plan is to keep people out. A lot of people use the forest responsibly for recreation, a few do not. Keeping everyone off of their public land is not the answer. I agree with thinning,reseeding, and some prescribed burns,but you need to take more care with these burns. Smoke is detrimental to our health,and I think you need more people on them to see that they don't get out of control,as has happened in the past.

(73-1) Thank you for your comment. Any change to each Forest's transportation system is outside the scope of the 4FRI analysis. This analysis will not make any decisions that would change the miles of open road or road use stipulations. The DEIS (web-based DEIS, pp. 28-29) states, "The Coconino and Kaibab NFs have identified the needed road system for public and administrative motorized use through the Travel Management Rule (TMR) process (see the transportation specialist report for details on forestwide transportation analyses). The TMR process identified a need to decommission approximately 770 miles of existing system and unauthorized roads on the Coconino NF. On the Kaibab NF, approximately 134 miles of unauthorized roads

		(often referred to as user-created routes) were recommended for decommissioning". This analysis focuses on the environmental impacts associated with decommissioning existing roads, unauthorized routes and providing adequate toad access to the project to facilitate implementation. The environmental consequences for transportation are located on page 318 to page 321 of the web-based DEIS. Regarding implementation of the prescribed burns, a post-NEPA burn plan will be developed to address how and under what conditions the prescribed burns will be conducted. Since the DEIS was released for public comment, the miles of road proposed for decommissioning have been updated. In the FEIS, approximately 726 miles of road is proposed for decommissioning.
McGuire, Tom	I have a few comments on the 4FRI. Please remember these are Public Lands. I don't think closing roads will do much to restore the forest, unless your plan is to keep people out. A lot of people use the forest responsibly for recreation, a few do not. Keeping everyone off of their public land is not the answer. I agree with thinning, reseeding, and some prescribed burns, but you need to take more care with these burns. Smoke is detrimental to our health, and I think you need more people on them to see that they don't get out of control as has happened in the past	(182-1) Thank you for your comment. It is beyond the scope of the 4FRI to determine which roads will be closed or remain open. The 4FRI DEIS is solely disclosing the effects of closing roads that have been outlined the each Forests respective TMR decisions. Please see our previous responses to letters number 6 and 11 regarding emissions from prescribed fire.
McKinnon, Taylor	1. Springs and Riparian Areas Springs and riparian areas are critical sources of biological diversity. The Trust supports provisions in the DEIS calling for protection and restoration of springs and riparian areas. As it has taken the liberty to do with Mexican spotted owl and northern goshawk habitat management, the Trust urges the Forest Service to enact changes to forest plans for springs and riparian areas. In this case we urge the Forest Service to amend plans in a way that affords additional rather than less protection to springs and riparian areas from anthropogenic forces	(172-1) Thank you for your comment. The actions as proposed would move towards springs and riparian area desired conditions. No specific spring-related forest plan amendment was identified.
McKinnon, Taylor	2. The DEIS doesn't analyze an adequate range of alternatives NEPA requires the Forest Service to analyze an adequate range of alternatives when undertaking an environmental impact statement. For the following reasons, we are concerned that the DEIS does not.	(172-2) Thank you for your comment. The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). "The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more

McKinnon, Taylor	The Forest Service did not analyze an alternative based on the stakeholder LTRS Large tree retention has been a focal point for discussion and debate related to restoration of southwestern ponderosa pine forests over the last three decades. The 4FRI stakeholder group worked diligently to develop a large tree retention strategy that would meet a multitude of needs – both ecological and social. We believe that the LTIS adopted by the Forest Service is far from a clear translation of the LTRS developed by the stakeholder group (See items 2 and 3 below). We believe that the NEPA process should more clearly and directly consider LTRS recommendations as	significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed “(36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14).The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. (172-3) Thank you for your comments. The conservation of large trees was identified as an issue 2 in the DEIS. In addition to evaluating the issue of large trees, an alternative that addresses the large tree retention strategy was considered but eliminated from detailed study (DEIS, pp. 56 to 58). Since the topic of retaining large trees has (in the past) implied the need for a d.b.h. cutting diameter limit, the DEIS includes an alternative considered but eliminated that would limit mechanical treatments to 16-inch d.b.h. as a means to protect large trees (DEIS, pp. 58-61). The DEIS included a process (appendix D) that addressed large tree retention during project implementation. The large

a basis for an alternative – if only for the purpose of clarifying meaningful differences between management approaches that contain large tree retention, versus those that do not.

b. The Forest Service should analyze alternatives based on current Forest Plans The Forest Service should analyze an alternative that adheres to forest plans currently in force. NFMA and its implementing regulations envision the Forest Service promulgating Forest Plans to guide project design. In this case, the Forest Service relies on a project to guide Forest Plan changes—but does so without demonstrating clearly how and why, in science or policy terms, adhering to Forest Plans is infeasible. In effect, NFMA has been turned on its head. NEPA envisions and in fact requires that an analysis of alternatives be the venue for such a comparison; the Forest Service should do so here by analyzing alternatives based on current Forest Plans.

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tree implementation plan (LTIP) provides guidance on how to conserve and promote large (young) trees in order to increase age classes that are under-represented (while moving towards the desired condition of having uneven-aged forest conditions). The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. (172-4) In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for

MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record.

McKinnon, Taylor	. The Forest Service should analyze a contract failure alternative The DEIS and its purpose and need and its effects analyses is predicated on there being sufficient industrial capacity to timely thin acres authorized in this and other NEPA decisions. The Forest Service's contract award to Pioneer Forest Products is a connected and related action to this EIS and those decisions; the Forest Service "intended [the contract] to be the first step toward implementing this ambitious goal and is expected to include restoration treatments on about 300,000 acres." IRSC Solicitation at 2. Because the chosen contractor has not and likely will not exhibit the capacity necessary to timely thin acres authorized in this and other NEPA decisions, the DEIS should anticipate planning scenarios that lack the industrial capacity envisioned in this contract. The EIS should analyze an alternative or alternatives that identify fewer, high priority acres for mechanical thinning—a number of acres that one could reasonably expect to be thinned given current industrial capacity—in combination with thinning by planned and unplanned ignitions. In the same vein, in its analysis of currently proposed action alternatives, the EIS should analyze the effects of the contractor being unable to undertake timely thinning of some or all of those acres. The EIS should discuss in detail if, how, why or why not the Forest Service will change plans in the event that industrial capacity does not exist for the foreseeable future.	(172-5) As you know, the Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). "The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed "(36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). Analyzing an alternative that is based on a hypothetical, reduced number of acres and not based on meeting the purpose and need (and forest plans) for landscape-scale restoration is considered unreasonable and outside the scope of this analysis
McKinnon, Taylor	3. The DEIS must be crystal clear that old growth logging will not occur We believe that some level of ambiguity still remains in the DEIS description of whether or not old growth logging will occur. We believe it is of paramount importance that old growth remains in place as critically important and rare components of a healthy	(172-6) The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the

functioning ecosystem. Any and all ambiguity regarding old growth logging should be removed from the document.

landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree range". The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to

clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

McKinnon, Taylor

4. The DEIS replaces the stakeholders' large tree retention strategy with an LTIS that is qualitatively different, and does not reflect a social license attained within the LTRS The Forest Service replaced the stakeholders' large tree retention strategy with its own "large tree implementation strategy." The latter differs from the former in at least two important ways: • The LTRS enacts a refutable presumption of large tree retention; that is, large trees are retained unless criteria for exception categories are met. The Forest Service's LTIS eliminates the presumption of retention. • The LTRS' exception categories make large tree removal discretionary when criteria are met. The Forest Service's LTIS makes large tree removal in those cases mandatory. Thus, where the LTRS limits large tree removal to exception categories, and in that case makes doing so discretionary, the Forest Service's LTIS mandates removal of large trees in some cases and eliminates any presumption of retention otherwise. They are, in their substance and effect, two entirely different rule schemes, the latter having been engineered to remove protection for mature trees and forest beyond that set forth in the Forest Service's latest interpretation of its Forest Plans.

(172-7) Thank you for your comments. Please see our previous response.

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5. Stand-scale Application of Canopy Cover and VSS Distributions In the DEIS, the Forest Service applies Forest Plan standards relating to canopy cover and VSS distributions at the group level. This is a change from the Forest Service's past implementation of those standards at the stand-scale. The change to group-level application of those standards, and the introduction of "interspace" into the VSS scheme, can result in far more open forests with far less mature and old forest than under the old stand-scale scheme. This is problematic because, unlike the 1996 amendments, which were applied regionally, the Forest Service's new scheme has not been subject to a region-wide EIS evaluating its impacts to forest management and wildlife at a regional scale. It is at these scales that population-level

(172-8) Post treatment landscape openness in goshawk habitat was presented as issue 3 in the DEIS. In the DEIS, the analysis of goshawk habitat components is located on pages 126 to 133 of the DEIS. Tree density is addressed in the DEIS (appendix D, implementation plan) on pages 619, 624, 626, 629, 632, 634 and 636. For example, the language on page 619 states, "Tree group density would be managed to meet the canopy cover requirement of 40 plus percent within mid-aged forest (VSS4), mature forest (VSS5), and old forest (VSS6) tree groups and to assure that immature tree groups (VSS 2 and 3) are managed to maintain tree stocking necessary to provide for desired canopy cover as the groups mature to VSS 4, 5, and 6. By following the stocking guidelines and maintaining interlocking or nearly interlocking tree

impacts stemming from forest management schemes are likely to manifest—impacts that this EIS, given its temporal and spatial scale, could certainly trigger. We have invested significant time and resources in developing datasets that could be used to compare and contrast different methodologies for interpreting canopy cover. These datasets were preliminarily considered, and a process for resolving concerns was preliminarily agreed to, but the process was short-circuited. We believe this is an important issue ecologically and socially, and more work needs to be done to answer outstanding questions, and resolve outstanding concerns.

Monitoring and adaptive management is critical to ensuring that 4FRI restoration projects result in desired effects and avoid undesired effects in accordance with expectations set forth in the EIS. This in turn requires a monitoring and adaptive management plan that is robust, transparent, scientifically defensible, and that triggers changes to management when monitoring results suggest a need to do so. Such a plan should be codified in the EIS, and should bear directly on the EIS' implementation. In order to maximize the

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crowns, tree group density would meet and exceed the canopy cover requirements. Stocking guidelines for tree groups for the WUI55, UEA40, UEA25, and UEA10 mechanical thin treatments are as described in table 119". In response to comments on the DEIS, the implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In the FEIS, additional analysis conclusions have been included for heterogeneity. For example, in the summary comparison of alternatives table (FEIS chapter 2), a heterogeneity category has been included. Metrics including percent openness or interspace (at landscape and habitat type sub-scale) and spatial arrangement have been used to describe the post-treatment condition. Also see the silviculture report.
(172-9) In response to comments on the DEIS an agency may: (1) Modify alternatives including the proposed action, (2) Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party

	quality of a monitoring and adaptive management plan, a draft of that plan should be made available for public and scientific scrutiny. Given the centrality of monitoring and adaptive management to 4FRI's overall efforts—and to the Collaborative Forest Landscape Restoration Program under which it is funded—the availability of such a plan for public and scientific review is also central to the public's ability to understand and evaluate the Forest Service's entire proposal for a restoration program. Here, the DEIS altogether lacks a comprehensive monitoring and adaptive management plan. We believe this greatly constrains one of the central purposes of the DEIS. It's absence from the DEIS largely precludes the public's ability to understand that plan, or, more importantly, 4FRI's overall restoration program. To remedy this problem, the Forest Service needs to clearly describe a comprehensive monitoring and adaptive management program, describe how that plan interacts with each action alternative's proposed implementation, and subject the plan to public scrutiny	monitoring board was created to manage and guide monitoring through project implementation. As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the "Adaptive Management" section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in how the plan questions and indicators are organized and change section name to "Monitoring: Desired Conditions, Indicators, Thresholds and Triggers", (6) Modified the "Monitoring Prioritization" section to reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and change section name to "Prioritization – Monitoring Tiers"; and (7) Modified the "Monitoring Scale" section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix B) informed people that the monitoring plan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species" section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation" section) and the development of the implementation plan (appendix D).
McKinnon,	We remain committed to seeing 4FRI succeed. The suggestions	(172-10) Thank you for your comments.

Taylor	described here are offered in the spirit of maximizing 4FRI's chances of success.	
McLean, Mary	This is the stupidest idea I have ever heard of....who is getting money back on this scheme? Burning our forests to create spaces in between also is ridiculous. When will the forest service realize they can't alter nature wisely? NO on this one.	(157-1) Thank you for your comment.
McMahon, Annie	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an	Thank you for your comment. Please see our response to Letter #19.

	integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Millard, Elizabeth	This "Forest Restoration" plan is very misguided. It will do far more harm than you have admitted to. Those of us living in New Mexico will be on the receiving end of massive amounts of smoke and we object to the chemicals you plan to use in these burns and the resulting air pollution you will send our way.	(79-1) Thank you for taking the time to comment. Please see our response to comment 6, 11 and 74 for discussion on emissions from prescribed fire that would be localized to areas in the vicinity of the Coconino and Kaibab NFs (northern Arizona).
Moore , K E	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by	(141-1) Please see the response to letter# 19.

Morris, Michelle	these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan.	(185-1) Please see our resposne to letter 19.
Morris, Michelle	The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening	(185-2) Please see the responses to letter #19.

Morris, Michelle	sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change.	(185-3) See our response to letter 19.
Moses, Cate	The proposed controlled burn of one million acres of forest in central Arizona is a controlled burn out of control. I live downwind from the area, I recreate outdoors daily, and I have seen firsthand the effects of controlled burns (like the Cerro Grande Fire) on humans, wildlife, and forests. This plan is madness. The use of the neurotoxin potassium permanganate to start fires, and the use of controlled burns to “thin” forests are not based in sound science.	(121-1) Please see our response to letters 6, 11 and 74.
Moses, Cate	I realize that fire ecology is complex, but Forest Service actions must be based in science and must cause more good than harm. The Four Forests Restoration Initiative does not meet these criteria. Calling this proposed wholesale destruction of forests and wildlife “restoration” is a misnomer at best.	(121-2) Please read, at a minimum, the vegetation, fire ecology and wildlife section in chapter 3 of the DEIS.
Moskiman, Karen	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about	Thank you for your comment. Please see our response to Letter #19.

whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Nez, Jonathan

Navajo County is located in eastern Arizona along the Mogollon Rim that marks the southern edge of the Colorado plateau.Navajo County has been a stakeholder in the effort to develop and implement landscape scale forested ecosystems restoration for the last decade and has been involved in the creation of the White Mountains Stewardship Project; the Governor's Forest Health Council's

(95-1)We appreciate your explanation of the positioning of the 4FRI within Navajo County's boundaries and the concerns of your county regarding 4FRI's activities.

Statewide Strategy for Restoring Arizona Forests; the collaborative Analysis of Small-Diameter Wood Supply in Northern Arizona; and, what has become the Four Forest Restoration Initiative.

Navajo County ("the County") is located in eastern Arizona along the Mogollon Rim that marks the southern edge of the Colorado Plateau. Four characteristics of the County are particularly relevant to the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative ("the 4FRI DEIS"): 1) One of the four national forests regrouped into the Four Forest Restoration Initiative ("4FRI"), the Apache-Sitgreaves National Forests, is located within Navajo County. 2) The landscape scale catastrophic wildfires in the national forests of the Southwest have a disproportionately large impact on the ecological, social and economic life of Navajo County and the neighboring eastern Arizona counties, and on the health and safety of their residents and visitors. Four of the five largest wildfires in Arizona, including two of the largest wildfires in the nation, have occurred within the five counties of the Eastern Arizona Counties Organization in the last decade: the Rodeo Chediski Fire of 2002 that consumed 460,000 acres; the Willow Fire of 2004 that burned 120,000 acre; the Cave Creek Complex Fire of 2005 that blazed through 244,000 acres and the Wallow Fire of 2011 that charred 538,000 acres. 3) Outdoor recreational activities conducted in the 4FRI national forests, such as, but not limited to, camping, motorized recreation, hunting, fishing, hiking, etc. by the local residents, and by visitors to the County recreating from metro Arizona to the Rim Country, have a disproportionately large impact on the economic well-being and the economic development of the County. 4) The County has made a long term commitment to proactively participate in, assume leadership roles in and provide political support at the state and federal levels for forest restoration and wildfire prevention efforts at local and landscape scales, such as the White Mountain Stewardship Project and the Four Forest Restoration Initiative that the County has been instrumental in creating and fostering. As such, Navajo County has a special interest in the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative.

Nez, Jonathan

While Navajo County recognizes that it is only one of the many constituents of the U.S. Forest Service, and does not seek special

Nez, Jonathan

(95-2) Please see the response to #95-1.

(95-3) Thank you for your comment about the role that Navajo County has played in the development of the 4FRI.

	consideration in the current comments and review process, we urge the Responsible Official to pay careful attention and give due consideration to the following comments in view of the uncommonly large effect that Forest Service land management decisions regularly have directly, or may occasionally have indirectly, on the County' residents and visitors' enjoyment, custom, culture, health, safety and economic well-being. Navajo County has been uniquely involved in: - Developing the concept of industry funded landscape scale restoration in Arizona; - Fostering the collaborative agreement that resulted in the 4FRI project; - Organizing the political support at the state and federal levels that made 4FRI possible; - Lobbying for the funding of landscape scale restoration in general, and 4FRI in particular, through the Collaborative Forest Landscape Restoration Program (CFLRP); and, - Resolving regulatory issues with the U.S. Department of Agriculture (USDA) and the U.S. Forest Service Washington Office (USFS WO), such as the cancellation ceiling issue, which hindered the implementation of industry funded landscape scale restoration. Navajo County, therefore, understands particularly well the issues at hand, the management processes engaged, the desired future conditions, and the difficulties and challenges involved. The County appreciates fully the USFS 4FRI Team's intent to: i) ensure an adaptive management planning and implementation process that is inclusive, efficient, collaborative and science-based to promote healthy, resilient, diverse and productive national forests and grasslands; ii) support natural resources-based rural economic development and employment; and, iii) ensure the enjoyment of the 4FRI national forests by the current and future generations in a balanced approach of preservation, conservation and sustainable exploitation of the natural resources. In a spirit of continuous improvement, and based on the direct practitioner knowledge and experience gained through a uniquely long, diverse, often productive and sometimes difficult participation in the Forest Service planning and implementation processes, Navajo County would like to share its comments, its appreciation for the obvious work put into the 4FRI DEIS, and its concerns and suggestions as follows. Role of Navajo County in the 4FRI DEIS Process Navajo County recognizes that the	
Nez, Jonathan		(95-4) Thank you for your County's commitment to the 4FRI project.

4FRI DEIS is a Forest Service-driven technical process, and generally supports the analysis mechanisms deployed by the USFS 4FRI Team to complete the assessment and the technical part of the planning. Although Navajo County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as an organization representing the most direct and local expression of democratic government at the individual district or national forest level, the County more generally defines its role at the policy-making level as it relates to public lands management processes. Therefore, although several of the following comments do apply to the technical aspects of the 4FRI planning processes, they purposefully do not address specific technical mechanisms thereof, and Navajo County is mostly satisfied that the USFS methodology is generally satisfactory, and that the studies that the USFS 4FRI Team in their expertise deem reliable, are adequate to support their technical conclusions (Lands Council v. McNair 537 F.3d 981 - 9th Cir. 2008). Therefore, Navajo County will focus its engagement in the 4FRI DEIS process, and its comments and suggestions, at the policy-making level and on whether the 4FRI Preferred Alternative contributes to the County's residents' and visitor's enjoyment, custom, culture, health, safety and economic well-being. The County will further focus its engagement on whether the 4FRI Preferred Alternative is consistent with the objectives of the County as expressed in its plans and policies; on how the 4FRI project impacts related planning efforts by the County; and, on the compatibility with and interrelated impacts of the 4FRI project and the County's plans and policies.

Per the requirements contained in the 2012 Planning Rule, Title 36 - Parks, Forests, And Public Property, Part 219 - Planning, Subpart A - National Forest System Land Management Planning, Section 4 - Requirements for public participation, subsection (b) Coordination with other public planning efforts, Navajo County expects that: "The responsible official shall coordinate land management planning with the equivalent and related planning efforts of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies,

Nez, Jonathan

(95-5) Thank you for referencing the 2012 Planning Rule. This project has been reviewed against the direction in the current "Coconino National Forest Plan" (forest plan), as amended (USDA 1987), the "Land and Resource Management Plan for the Kaibab National Forest, as revised" (USDA 2014) and 36 CFR 219.17(b) (3). For clarification, this project has proposed three nonsignificant forest plan amendments for the Coconino NF. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3)

	and State and local governments" (36 CFR 219.4 (b)(1)). Navajo County further expects that: "The results of this review shall be displayed in the environmental impact statement (EIS) for the plan", and that "this review shall include consideration of: (i) The objectives of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments, as expressed in their plans and policies; (ii) The compatibility and interrelated impacts of these plans and policies; (iii) Opportunities for the plan to address the impacts identified or to contribute to joint objectives; and, (iv) Opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives" (36 CFR 219.4 (b)(2)). Navajo County posits that these statutory requirements are meant by Congress to imply more than a perfunctory review process resulting in a check mark in a 'coordination box' and imply a sincere and proactive resolution effort to reduce and resolve potential conflicts between aspects of 4FRI DEIS and objectives expressed in the County's plans and policies; such as, but not limited to, those relevant to forested ecosystems restoration and catastrophic wildfire prevention objectives, watersheds restoration objectives, rangelands resources management objectives, or forest products resources management objectives. Navajo County is committed to resolve or reduce potential conflicts between the 4FRI DEIS and the County's plans and policies, and understands that such resolution must take place within the context of developing the 4FRI project's desired conditions or objectives. To this effect, it is the intent of Navajo County to avail itself of the opportunity contained in the 2012 Planning Rule that specifies that: "Where appropriate, the responsible official shall encourage States, County, and other local governments to seek cooperating agency status in the NEPA process for development, amendment, or revision of a plan" (36 CFR 219.4 (a)(1)(iv)).	provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule.
Nez, Jonathan		(95-6) Please see the response to #95-5.
Nez, Jonathan	The County's policy making decisions and management actions are guided by the County plan. This plan guides the actions of the Board of Supervisors and the County staff toward meeting the present and future enjoyment, custom, culture, health, safety and economic well-being needs of the County's residents or visitors. The County	(95-7) Thank you for your comments. All comments and responses for any public involvement effort are located in the project record.

Nez, Jonathan	planning effort integrates the principles of: 1) Monitoring the effects and impacts of the implementation of the County policies, as well as the direct, indirect, individual and cumulative effects and impacts on the County and its residents and visitors of the policy decisions and management actions taken by state and federal agency partners; 2) Monitoring all demographic, social, economic, cultural and other variables, whether internal or external, which are relevant to the County's policy making decisions and management actions; and, 3) Dynamic and generally informal adaptive management. As such, the County plan is an evolving dynamic plan that constantly adapts, often informally, in response to the evolving ecological, economic, social and cultural environment, and that is formulated as much through the regular deliberations of the County's Board of Supervisors and the resulting Resolutions of the Board, as it is in the formal planning documents. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), the County plan defined as the accumulation of the formal County planning documents and the County public record of Board of Supervisors deliberations and resolutions, is hereby entered into the 4FRI NEPA record. Navajo County appreciates and supports the extensive and thorough analysis performed by the USFS 4FRI Team for the 4FRI DEIS, and the discussion of the effects of the no action alternative and the three action alternatives on: Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; Transportation; Climate Change; Short-term Uses and Long-term Productivity; Unavoidable Adverse Effects; Irreversible and Irretrievable Commitments of Resources; and, Cumulative Effects. Multiple resources analyzed individually by the USFS 4FRI Team in the 4FRI DEIS are regrouped in a smaller number of overarching natural resources management policy objectives by the County. In no particular order, the County's natural resources management objectives relevant to the 4FRI DEIS comments include: 1) Rangelands Resources Management Objectives. Rangelands	(95-8) Thank you for your explanation of how the resources were regrouped for Navajo County's analysis of the 4FRI DEIS. We appreciate your interest and the time and effort expended in analyzing the DEIS.

Resources Management Objectives address issues such as, but are not limited to, grazing availability, suitability, sustainability; ecological, economic and social carrying capacity; access; contribution to rural economic development; and, contribution to local Western custom and culture. 2) Forest Products Resources Management Objectives. Forest Products Management Resources Objectives address issues such as, but are not limited to, logging availability, suitability, sustainability, productivity, access; contribution to rural economic development; and, contribution to rural Western custom and culture. 3) Mineral and Energy Resources Management Objectives. Mineral and Energy Resources Management Objectives address issues such as, but are not limited to, the availability, suitability, sustainability, productivity, access, and contribution to rural economic development of (a) solid, liquid or gaseous mineral resources and (b) solar, wind, hydropower, geothermal and other natural renewable energy resources. 4) Motorized Travel and Recreation Management Objectives. Motorized Travel and Recreation Management Objectives address issues such as, but are not limited to, motorized access; motorized travel; motorized big game retrieval; motorized dispersed camping; motorized gathering of firewood; motorized access to dispersed fishing; motorized recreation opportunities; inventoried roadless areas; wilderness area designation; motorized access to grazing and logging opportunities; contribution of motorized access, recreation and travel to rural economic development; and, contribution to local Western custom and culture. 5) Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives. Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives address issues such as, but are not limited to, protection of County's residents and visitors; protection of collective and individual real properties; protection of transportation, energy and water collection and distribution infrastructures; ecological restoration of forested ecosystems; local scale restoration projects; landscape scale restoration projects; social license required for the non-conflictual and non-litigious implementation of restoration efforts (such as the one requested in public statements by former USFS Southwestern Regional Forester Corbin Newman for the Four

	Forest Restoration Initiative); industry development required to implement and fund restoration efforts through economically viable utilization of the wood products; and, long term guarantees of wood supply necessary to attract private investments in a small diameter utilization infrastructure in northeastern Arizona. 6) Watershed Restoration Objectives. Watershed Restoration Objectives address issues such as, but are not limited to, ecological restoration of watersheds; protection and development of water collection and distribution infrastructures; monetization of watershed ecosystem services; downstream consumption contribution to upstream production investments and maintenance; and, interactions between watershed functions and multiple use functions. 7) Management Areas Designation Objectives. Management Areas Designation Objectives address issues such as, but are not limited to, the nomination, designation, and management of (a) inventoried roadless areas (which are technically not management areas per se but are an administrative designation) and (b) wilderness areas, primitive areas, research natural areas, wildlife quiet areas, and wild and scenic rivers; and, effects on socioeconomic resources and impacts on the other County objectives. Navajo County understands that some of these objectives are not directly relevant to the 4FRI DEIS inasmuch as, for example, the 4FRI alternatives are not contemplating the designation of management areas. However, most of these objectives are relevant to the 4FRI DEIS, inasmuch as the 4FRI alternatives either have direct effects on some County's objectives, such as Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives; Forest Products Resources Management Objectives; Watershed Restoration Objectives; and, Rangelands Resources Management Objectives; or, may have indirect effects on some County's objectives, such as Motorized Travel and Recreation Management Objectives. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), this document: Navajo County comments on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative is hereby incorporated into the County's expressed plans and policies.	
Nez, Jonathan		(95-9) Thank you for your comment.

Nez, Jonathan	Navajo County, therefore, expects that: i) the Responsible Official shall coordinate land management planning with the County equivalent and related planning efforts (36 CFR 219.4 (b)(1)); ii) the consistency review and coordination action shall include consideration of the objectives of the County as expressed in its plans and policies; and, iii) the Responsible Official shall consider opportunities to resolve or reduce conflicts, should some arise between the 4FRI DEIS and the County's objectives (36 CFR 219.4 (b)(2)).	(95-10) Please see the response to #95-5 for information concerning the relevant planning rule under which 4FRI was initiated.
Nez, Jonathan	Per the requirements of 36 CFR 219.4 (b)(2), 40 CFR 1502.16(c) and 40 CFR 1506.2, Navajo County hereby requests that the results of the consistency review and coordination action between the 4FRI DEIS and the County's objectives as expressed in its plans and policies shall be displayed in the Four Forest Restoration Initiative Environmental Impact Statement.	Please see the response to #95-5.
Nez, Jonathan	Navajo County appreciates and supports the fact that all three action alternatives include a clear priority for restoration treatments (PDEIS p. 62).	(95-12) Thank you for your support.
Nez, Jonathan	Navajo County recognizes that the issues of forested ecosystem restoration and forest products management are fundamentally different, and are typically not discussed simultaneously in ecosystems non-departed or little departed from characteristic reference conditions. However, as the Forest Service and the County both generally acknowledge: current conditions in the forested ecosystems and especially in the ponderosa pine and dry or wet mixed conifers-dominated forests of eastern Arizona are considerably departed from reference conditions, and at risk of continued uncharacteristic disturbances such as landscape scale catastrophic crown fires or insect infestations. Also, Navajo County acknowledges and appreciates the efforts made by the Forest Service, and particularly the Arizona national forests, to pioneer larger scale restoration efforts such as the White Mountains Stewardship Project. The County has been and continues to be supportive of the White Mountain Stewardship Project and of its funding as a practical tool to initiate larger scale treatments and to incentivize the creation of a small diameter trees utilization infrastructure. Simultaneously, the County acknowledges that the	(95-13) Thank you for your support of the 4FRI project and for your suggestions and recommendations.

	model of subsidized restoration treatments is not scalable at landscape level, as is required to restore the forests of Arizona, for lack of agency funding. As proposed in the Four Forest Restoration Initiative, an initiative that the County was instrumental in creating, fostering and developing, landscape scale forest ecological restoration appears currently feasible only if it is funded by the economically viable utilization of the forested byproducts of restoration by private industry. While it is actually not a novation when it comes to forest products, as timber sales have been for centuries an established form of natural resources valuation and have funded the management of the resources, the concept of ecosystem services monetization is relatively new to the discussion of ecological restoration funding, and its full implications are still being tested. As a consequence, Navajo County suggests that both the County and the USFS 4FRI Team operate under a very specific constraint when it comes to forest restoration, inasmuch as the forest products industry in Arizona is the funding mechanism for landscape scale restoration in eastern Arizona, which imposes the concept of social acceptability or 'social license' for appropriate scale industry to fund restoration logging activities at the landscape scale throughout the 4FRI project.	
Nez, Jonathan	Navajo County's Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives for the upcoming planning cycle include, among others: 1) Design and implement landscape-scale, consensus-based, industry-supported, accelerated community protection and forested ecosystems restoration in the 2.4 million acre ponderosa pine and mixed conifer-dominated forests of the Mogollon Rim. 2) Develop and sustain the social license required by Southwestern Regional Forester Corbin Newman as a prerequisite to the implementation of industry-supported landscape scale restoration. 3) Participate actively in the NEPA process, as a member of the public and as a Cooperating Agency, and provide robust comments to the Forest Service to ensure NEPA process integrity and survivability in the face of potential threats of litigation. Emphasize with the Forest Service a strategy of risk mitigation and focus on the end goal of accelerated restoration over partisan debates and	(95-14) Thank you for your suggestions and recommendations.
Nez, Jonathan		(95-15) Thank you for your explanation of Navajo County's objectives for the upcoming planning cycle.

	exclusive focus on technical sciences to the detriment of social science and social license. 4) Create in eastern Arizona the wood supply conditions for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 5) Wherever and whenever possible, prioritize forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona with multiple industrial scale new investments.	
Nez, Jonathan	Navajo County appreciates and supports the fact that all three action alternatives include a clear focus on mechanical restoration treatments yielding forest products (PDEIS p. 62).	(95-16) Thank you for your comment.
Nez, Jonathan	The inherent challenge faced by Navajo County and the USFS 4FRI Team is that the priorities typically considered when managing forest products, such as a sustained yield of harvest volumes on a regulated non-declining even-flow basis for the long term, uneven age structures, long term sustained yield capacity (LTSYC), non-declining allowable sale quantity (ASQ), etc., are augmented and complicated, and to a large extent superseded, by the overwhelming priority to complete landscape scale restoration as rapidly as possible for fear of massively disruptive landscape scale catastrophic crown fires and/or landscape scale insect or disease infestations. Owing to the fact that for the foreseeable future green forest products will likely be byproducts of restoration treatments, and green forest products will likely continue to be at risk of destruction by catastrophic fires if landscape scale restoration is not expeditiously implemented, the County suggests that forest products management actions for the upcoming planning cycle must be dictated not only by traditional silviculture science and best practices, but primarily by the absolute priority of implementing landscape scale restoration as expeditiously as possible using mechanical treatments that produce the forest	(95-17) Thank you for your comment and understanding of the challenges inherent with planning and implementing landscape-scale restoration activities.

	products necessary to not only sustain the existing forest industry in the White Mountains, but also to allow robust natural resources-based rural economic development through the creation of an entirely new infrastructure of small diameter trees utilization at industrial scale. Navajo County's Forest Products Resources Objectives for the upcoming planning cycle include, among others: 1) Create in eastern Arizona the wood supply conditions necessary for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 2) Sustain in the White Mountains the wood supply conditions necessary for the continued development and growth of the existing local industry, with expanded economically viable small diameter trees and residual biomass utilization facilities capable of funding the initial ecological restoration thinning of at least 15,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 3) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for sustained yield of harvest volumes on a regulated, non-declining even-flow basis for the long term, to the overriding priority of implementing as expeditiously as possible landscape scale restoration based primarily on mechanical treatments producing forest products. 4) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for uneven age management to the overriding necessity of sustaining the social license required to implement landscape scale restoration expeditiously and in a non-conflictual and non-litigious manner, as relates to the protection of old growth and the retention of large trees (upcoming old growth) where vegetative structural stages (VSS) 5 and 6 are deficient at stand or forest scale.	
Nez, Jonathan	Navajo County appreciates and supports the analysis performed by	(95-18) Thank you for your explanation of the County's Forest Products Resources objectives.
Nez,		(95-19) Thank you for your comment regarding the watershed analysis

Jonathan	the USFS 4FRI Team using the Watershed Condition Framework (WCF) to identify 6th level Hydrologic Unit Code (HUC) Class 1 (Functioning), Class 2 (Functioning-At-Risk) and Class 3 (Impaired) watersheds in the 4FRI project area, and to analyze the direct and indirect effects of the 4FRI project on water quality and water yield.	framework.
Nez, Jonathan	Uncharacteristic landscape scale forest crown fires in eastern Arizona have a demonstrated negative impact on the conservation and operation of the watersheds in which they occur. In addition to the damages caused to communities and ecosystems by the fires themselves, the most common negative effects on watersheds documented after the Rodeo-Chediski Fire, the Wallow Fire, in some areas, and the Schultz Fire, among others, are: uncharacteristic runoffs, catastrophic flooding, accelerated and aggravated soil erosion, streams and reservoirs sedimentation, and long term severe disturbance of the watershed functions.	(95-20) Thank you for your comment concerning the effects of high-severity fire on watershed functions.
Nez, Jonathan	The Rim Country constitutes a large portion of the watersheds that contribute significantly to the water supply of the metro Arizona and greater Phoenix area. The threat of additional uncharacteristic landscape scale forest crown fires in eastern Arizona, especially on the south slopes of the Mogollon Rim, raises serious concerns about the conservation and operation of the eastern Arizona watersheds. Additionally, the specific risk to the East Clear Creek watershed poses an existential threat to the Town of Payson's water supply. With the growing realization that uncharacteristic landscape scale forest crown fires affect the conservation and operation of the watersheds in which they occur, efforts to protect watersheds have recently been initiated in the Southwest. Several of these efforts focus on the monetization of the ecosystem services provided by the watersheds, and on an attempt to enroll the financial contribution of the downstream beneficiaries of the services (water consumers in this case) to the financial costs of protecting the upstream provider areas and the utility corridors delivering the services (forests, watersheds and water collection and distribution infrastructures at risk of catastrophic fires in this case). Such efforts were pioneered by the Denver Forest to Faucet project in Colorado, or the Santa Fe Municipal Watershed Protection project in New Mexico, among others. In Arizona, with the active contribution of Navajo County, an	(95-21) Thank you for your explanation of the County's role in watershed restoration on the Mogollon Rim.

	effort to create the Arizona Watersheds Investment Fund (AWIF) is underway, and in Flagstaff, Ballot Question #405 received electors' approval in November 2012 for the issuance of a $10 million municipal bond to finance the restoration treatments of high threat areas in the Rio de Flag and Lake Mary watersheds to provide greater protection to the community from the impacts of fires and floods. Therefore, the restoration of forested ecosystems, ponderosa pine and mixed conifer-dominated, in the watersheds of the Mogollon Rim in general, and specifically in the East Clear Creek watershed, is an objective priority, among other areas in eastern Arizona also in need of restoration treatments, for Navajo County, after the direct protection of communities and infrastructures. Navajo County's Watershed Restoration Objectives for the upcoming planning cycle include, among others: 1) Prioritize restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures, on the slopes of the Mogollon Rim in general, and specifically in the East Clear Creek, Verde River, Little Colorado River, Upper Gila River, and Upper Salt River watersheds. 2) Develop the Arizona Watersheds Investment Fund (AWIF), and/or similar initiatives in order to fund restoration treatments that cannot be funded by the wood industry utilization of the forest byproducts of restoration in areas where the merchantable material yield is insufficient for mechanical treatments to be economically viable, or access by mechanical harvesting equipment is restricted, such as in steep slopes, high erosion areas, riparian areas, etc. 3) Develop in parallel and in a complementary manner all models of watersheds	
Nez, Jonathan	restoration funding such as industry funding, ecosystem services funding, municipal bonds funding, etc. Navajo County appreciates the addition of grassland restoration treatments to forestland treatments in Alternative C, the Preferred Alternative. The County believes that this addition is significant not only because it implies the restoration of approximately 50,000 acres of rangelands, but because it aptly diversifies the concept of landscape scale restoration from a restrictive interpretation of	(95-22) Thank you for your explanation of the County's watershed restoration objectives.
Nez, Jonathan	'forested ecosystems restoration' toward a broader concept of truer 'landscape restoration.' Navajo County's Rangelands Resources	(95-23) Thank you for delineating Graham County's rangeland objectives.

Management Objectives Navajo County's Rangelands Resources Objectives for the upcoming planning cycle include, among others: 1) Restore encroached grasslands, including the most departed semi-desert, Great Basin, and montane subalpine grasslands that have been invaded by trees (subalpine grasslands) and shrubs (semi desert and Great Basin grasslands) by removing trees and shrubs where economically feasible, promoting a mixture of native perennial grass species, implementing the periodic prescriptive use of mixed classes of livestock matching animal feeding habits with specific plant material, and reintroducing a regime of cool surface fires in order to reduce trees and shrubs colonization and erosion hazards, and to increase livestock forage production. 2) Adopt management practices that discourage the establishment of nonnative species and eradicate invasive weed species that have little to no forage value, recognizing the fact that the ecological or economic consequences of different exotic species are not all the same, and that the persistence of some nonnative species that are not necessarily undesirable or controllable, such as Kentucky bluegrass or Bermuda grass, may be beneficial from a socioeconomic perspective and a balanced management for multiple resource objectives. 3) Allocate grass reserves on an allotment-by-allotment basis through proper range management, rather than on a district-by-district basis, which requires additional financial considerations for improvement maintenance. 4) Shift the grassland management process from the concept of balancing livestock grazing with available forage - which only addresses stocking rate - toward the concept of managing the intensity, frequency, seasonality, duration and classes of livestock grazing to accomplish the rangelands resources management objectives. 5) Emphasize adaptive management of the rangelands using a three step rangelands resources management monitoring approach of quantitative monitoring using standard measurements such as stocking rate, ground cover, etc.; qualitative monitoring using measurements such as species composition, age, nutritional value, etc.; and, effectiveness monitoring using outcome measurements such as range health, soil water holding capacity, soil organic content, livestock weight gain, wildlife indicator species, etc., in order to measure whether the management actions produce the site

Nez, Jonathan	specific and cumulative direct and indirect effects desired. 6) Integrate the scientific research and implement the science-based recommendations developed by rangelands resources management experts and scientists. 7) Preserve the contributions of the rangelands resources to the economic development and the custom and culture of the rural Arizona counties. Navajo County would like to preface any subsequent comment by the following four preliminary comments: 1. The quality and thoroughness of the work exhibited by the USFS 4FRI Team in the 4FRI DEIS is outstanding. Navajo County is fully conscious of the fact that an enormous commitment was made and delivered upon by the USFS 4FRI Team, and that a legitimate pride of ownership must rest with the authors of the DEIS, as well as the Specialists' reports and other documents not published with the 4FRI DEIS but nonetheless part of the 4FRI project record. The County urges the USFS 4FRI Team to consider the County's comments NOT as a critic of their work, but as a goodwill effort toward continuous improvement of the 4FRI EIS, and as a proactive effort by the County to disclose its objectives, plans and policies, and the rationales that support them, to facilitate the statutorily required consistency review, coordination action and conflict reduction regarding potential discrepancies between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and as discussed in this document. 2. Strategically, Navajo County overwhelmingly supports the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the following suggestions. Therefore, the following concerns and suggestions are not aimed at questioning the need to implement 4FRI but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process, which could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project as intended by the County. 3. Navajo County readily acknowledges that several of the following comments and suggestions have already been addressed and agreed upon by the USFS 4FRI Team in the course of the work conducted by the DEIS Review Workgroup of the 4FRI Stakeholders Group with the USFS 4FRI Team. Also, considering the participation of the County in both	(95-24) Thank you for recognizing the collaborative effort that has gone into the analysis. Your concerns and suggestions have been noted in the specific responses to the comments which follow.

the 4FRI Stakeholders Group and the DEIS Review Workgroup, there is a high probability that there will be some level of repetition and redundancy between the County's comments and the 4FRI Stakeholders Group comments, as well as comments from other stakeholders. Nonetheless, the NEPA process calls for comments on the DEIS as published, and for the formulation of the County's concerns and suggestions, regardless of whether these are echoed in other comments or not. 4. As previously noted, although Navajo County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as a body representing the most direct and local expression of democratic government at the individual district or national forest level, Navajo County more generally defines its role at the policy-making level as it relates to public lands management processes. Navajo County, therefore, believes that it is appropriate to comment at the programmatic level, from a Forest Service perspective, and at the objectives level, from a County's policy perspective.

For clarification, Navajo County wants to emphasize that although it generally supports the use of Best Available Scientific Information (BASI) for management decision, it does not support the exclusive use of technical sciences to formulate policies or to make strategic decisions that have an important impact on people. The County believes that these decisions must integrate social sciences in the decision making process. For example, the County believes that while there is no overwhelming supporting science on either side of the long debated issue of a universal diameter cap for restoration treatments (whether it be 9", 12", 16" or 18"), analyzing the issue of a diameter cap from just a technical science perspective is at best incomplete, because the issue of large trees retention is not only a technical issue, but also a social issue that cannot be adequately addressed by an exclusively scientific approach. Therefore, Navajo County comments will purposefully not emphasize technical issues of silviculture, such as uneven aged composition, regeneration openings, etc., but will be focused on what the County believe to be the crux of the successful and timely implementation of the

Nez, Jonathan

(95-25) Thank you for your comment. CEQ requires the use of the best available science when analyzing the effects of each alternative; the most relevant science based on research specific to the analysis area was used to formulate their reports. In the DEIS, an alternative was considered but eliminated from detailed study that would have limited mechanical treatments to 8-inch d.b.h. It was determined that it would not meet the various elements of the purpose and need (see p 8 of the DEIS). The DEIS documents an alternative considered but eliminated from detailed study that would incorporate the 4FRI stakeholder group-created Large Tree Retention Strategy (LTRS, or also referred to as the Old Growth Protection and Large Tree Retention Strategy) as written. A modified version of the original strategy, the Large Tree Implementation Plan, or LTIP, was included in alternatives C and E. A complete crosswalk document showing the modifications from LTRS to LTIP, as well as the rationale for not including the original LTRS, is in the project record and may be accessed on the 4FRI website at: http://www.fs.usda.gov/main/4fri. The DEIS documents all alternatives considered but eliminated from detailed study (with rationale) on pages

	overriding priority of landscape scale scientifically and socially acceptable – if admittedly imperfect – ecological restoration and catastrophic wildfire prevention. Namely: • Social acceptability of proposed treatments; • Speed of completion of landscape scale restoration; and, • Prioritization of treatments.	48 to 61. Overall, five alternatives were considered but eliminated. The FEIS documents six alternatives were considered but eliminated. Regarding implementation many factors including, but not limited to, the technical, economic, and social spheres – will influence the speed of completion. Specific responses to individual comments may be found below.
Nez, Jonathan	Alternative A, the no action alternative, does not offer the option of continuing an existing management approach to landscape scale forested ecosystems restoration in eastern Arizona inasmuch as there is currently no such approach. Alternative A would nonetheless result in the mechanical treatment of approximately 87,000 acres, and in the prescribed fire treatment of approximately 143,000 acres over the next five years (DEIS p. 62). However, the scale and pace of these management actions are incompatible with the urgent need to implement landscape scale restoration as identified in the purpose and needs for the 4FRI NEPA process. Therefore, Navajo County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative A. Navajo County understands the NEPA requirement for the 4FRI DEIS to analyze a no action alternative, and the County acknowledges and appreciates the existence of constituencies favoring no action. However, Navajo County cannot support an alternative that would result in the continuation of an unmitigated high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Navajo County is concerned that Alternative A is in direct conflict with the County's objectives as expressed in its plans and policies.	(95-26) Thank you for your comment. We agree that alternative A (no action) would not meet the purpose and need for landscape-scale restoration as defined on page 8 of the DEIS.
Nez, Jonathan	Navajo County regrets to suggest that there is no possible corrective action to mitigate the incompatibility of Alternative A with the County's objectives as expressed in its plans and policies, or to resolve or reduce the conflict between Alternative A and the County's objectives as expressed in its plans and policies. Alternative A is so departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Navajo County's natural resources management objectives, that it does not warrant any	(95-27) Thank you for your comment.

Nez, Jonathan	further discussion from the County's perspective. Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) both generally meet the purpose and needs of landscape scale restoration in eastern Arizona, as analyzed by the USFS 4FRI Team, and the County. For all practical purposes, Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) share many similarities: 1. The acreages treated, both mechanically and by fire-as-a-first-entry (approximately 388,000 acres treated mechanically and 588,000 treated with fire in Alternative B; and, approximately 434,000 acres treated mechanically and 593,000 treated with fire in Alternative C) are very similar; and, 2. The differences in acreage treated mostly result from the addition of grassland treatments to forestland treatments in Alternative C. Nonetheless, there are some differences between Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative): 1. The addition of grassland treatments to forestland treatments in the Preferred Alternative is significant inasmuch as it diversifies aptly the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape' restoration; 2. The increase in mechanical treatments upper limit from 16" to 18" diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) in the Preferred Alternative, while relatively minor from a treatments perspective, is likely to have an impact on the social acceptability of the proposed treatments; 3. The integration of some reworded components of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the Preferred Alternative is likely to have an impact on the social acceptability of the Preferred Alternative; and, 4. The integration of research projects in the Preferred Alternative is a welcome addition. Navajo County clearly views the addition of grassland treatments to forestland treatments in Alternative C as a positive step toward meeting the County's Rangelands Resources Management Objectives, and generally supports the integration of research projects into restoration implementation projects, wherever and whenever feasible. The County further supports the integration of stakeholders-developed	(95-28) We will note that Navajo County is supportive of the increased number of grassland acres to be restored, and the inclusion of research projects in alternative C. It will also be noted that the County believes that increasing the mechanical treatments upper limit form 16" to 18" d.b.h. in the MSO PACs will harm the social acceptability of alternative C. In addition, we understand the County is opposed to including a reworded OGPLTRS into the preferred alternative (C) and believes anything less than a full integration of the stakeholder group's created document will also harm social acceptability. Please also see the responses to #76-31 and #76-51 for more information regarding the modified OGPLTRS included in the FEIS.

	strategies and foundational documents such as the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the 4FRI DEIS.	
Nez, Jonathan	Conversely, Navajo County is concerned that the adaptation of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) into the USFS 4FRI Team Old Trees Implementation Plan (OTIP) and Large Trees Implementation Plan (LTIP) may have an impact on the social acceptability of the Preferred Alternative, as further discussed in the later sections Old Growth and Large Trees. Therefore, Navajo County generally supports the concepts presented in Alternative C, the Preferred Alternative, provided that it is further refined per the suggestions offered in the County's comments, as well as comments from other stakeholders critical to the viability of the 4FRI social license. However, Navajo County is concerned that some decisions made by the USFS 4FRI Team may compromise the social license developed for the implementation of the 4FRI project. Consequently, Navajo County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by some decisions made by the USFS 4FRI Team that may compromise the social license developed for the implementation of the 4FRI project, present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(95-29) Thank you for your comment and tentative support of the preferred alternative. Navajo County's concerns about the possible effect on the social license and viability of project implementation if alternative C is chosen (as stated presently) have been noted.
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team and the Responsible Officials exercise careful judgment in their decisions, in relation to: i) the true material importance of the issues, as opposed to their symbolic or emotional importance; and, ii) the potential effect of litigation on the implementation of the 4FRI project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' recommendations, and the major benefits attached to sustaining the 4FRI social license.	(95-30) Thank you for your comment.
Nez, Jonathan	Alternative D is identical to Alternative B (the Proposed Action) as regards mechanical treatments. It is also identical to Alternative C (the Preferred Alternative) as regards mechanical treatments, except for the minor difference of upper limit of diameter at breast height	(95-31) It will be noted that Navajo County is opposed to alternative D.

(d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs). The critical difference between Alternative D and Alternatives B and C is the use of fire as a treatment. In alternative D fire would be used on only approximately 179,000 acres, compared to 588,000 acres in Alternative B and 593,000 acres in Alternative C. Navajo County is concerned that the drastic reduction in the use of fire as a thinning treatment in Alternative D could prevent the timely completion of landscape scale restoration on the Mogollon Rim within the next 20 years as intended with the 4FRI project. The County favors, wherever and whenever possible, prioritizing forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona, with multiple industrial scale new investments. However, the County also recognizes that industry funded mechanical treatments are not appropriate in many sensitive areas such as steep slopes, fragile soils, riparian areas, etc., or in areas where the merchantable yield of restoration treatments would be economically unviable. Further, Navajo County acknowledges that agency funded mechanical treatments or hand thinning are disproportionately expensive as compared to fire thinning, and the County appreciates that, as discussed in a different context but still related to the implementation of 4FRI treatments in the Apache-Sitgreaves National Forests Land Management Plan PDEIS: “the alternatives were realistically designed to reflect anticipated budgets and workforce capabilities,” and “none of the alternatives would actually treat enough acres fast enough to fully reach desired conditions within the first 5 decades” (A/S PDEIS p. 440). The use of fire as a treatment tool is, therefore, not a luxury from a timeline, economic or practicality perspective, but is instead a necessity. Additionally, the County believes that the ecological role of fire is absolutely critical to the long term ecological sustainability of the forested ecosystems of the Southwest, and that a management alternative that would reduce unduly the use of fire could compromise, in the long term, the implementation of post-treatment maintenance

burns. In consequence, Navajo County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative D. Navajo County understands the NEPA requirement for the 4FRI DEIS to analyze significantly different alternatives, and the County acknowledges and appreciates the existence of constituencies concerned with prescribed fire emissions, and who favor alternatives such as Alternative D. However, Navajo County cannot support an alternative that could reduce the scope and significantly slow the pace of landscape scale restoration in eastern Arizona, which could result in the unnecessary prolongation of a high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Navajo County is concerned that Alternative D is not compatible with the County's objectives as expressed in its plans and policies. Suggested action Navajo County is concerned that there may not be a corrective action to mitigate the incompatibility of Alternative D with the County's objectives as expressed in its plans and policies. Alternative D is too departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Navajo County's natural resources management objectives, to warrant further discussion from the County perspective.

Notwithstanding any of the above, Navajo County is concerned about the three action alternatives and the range of alternatives that they represent. Specifically, even though Navajo County recognizes differences between the three action alternatives as discussed in the previous sections Alternatives B and C and Alternative D, the County is concerned that the mechanical treatments in each of the three action alternatives are similar enough in scale, scope and intensity that the DEIS may not offer an actual range of alternatives when discussing mechanical thinning. Arguably, the difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) is minor, and the addition of grassland treatments in Alternative C or the reduction of fire treatments in Alternative D do not affect forestland mechanical treatments per se. Navajo County itself is generally satisfied with the

Nez, Jonathan

(95-32) The DEIS (pp. 48 to 104) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public. This is consistent with the Agency's direction on alternatives, "Develop and consider alternatives that would resolve conflicts about the proposal" (FSH 1909.14, page 32) and using collaboration, "Ongoing collaboration may often result in modification of a proposed action or alternative(s), resulting in a better proposal and ultimately a better decision. Such changes may not necessarily require the development of a new alternative if they can be accommodated through modification of an existing alternative" (FSH 1909.14, page 32). The IDT identified two metrics that will be added to the comparison of alternatives table and discussion: volume of emissions and potential effect to sensitive

mechanical treatments proposed in alternatives B, C and D, provided these treatments are refined to integrate the suggestions of the County and other stakeholders integral to the 4FRI social license. However, the County is concerned that the 4FRI DEIS could be perceived as a DEIS based on a single alternative of mechanical treatments, with non-significant variations between the three action alternatives. Therefore, Navajo County is concerned that the 4FRI DEIS may fail to comply with the Council on Environmental Quality (CEQ) requirements to provide and analyze a range of alternatives (Sec. 1505.1 (e) and Sec. 1502.14 (a)) and that the absence of a broader range of analyzed mechanical treatments alternatives may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a broader range of analyzed mechanical treatments alternatives, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Navajo County respectfully suggests that the USFS 4FRI Team request a third party legal review of the NEPA and CEQ requirements in, and of the 4FRI DEIS compliance with, Sec. 1505.1 (e) and Sec. 1502.14 (a).

The degree of canopy openness in the immediate post-treatment conditions and in the long term desired future conditions has for several years been an issue of debate among the 4FRI stakeholders and the 4FRI collaborative group, including the USFS 4FRI Team, and is likely to remain one. This issue is linked to the discussion of whether vegetative structural stages (VSS) and canopy closure should be measured at group level, as proposed in the 4FRI DEIS, or at stand level, as currently implemented under the Coconino National Forest Plan. Amending the Forest Plan will resolve the technical compliance issue, but it does not address the more fundamental question of whether guidelines originally designed to be implemented at stand or even forest scale (outside Mexican Spotted Owl protected areas) are directly transferable, or not, to groups within stands. Additionally, the creation of interspaces between groups, in addition

Nez, Jonathan

receptors (smoke). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments will be analyzed. This will increase the number of alternatives considered in detail to five (including no action). More importantly than the sheer number of alternatives is whether unresolved issues have been addressed through alternative development or environmental analysis. The Agency's procedures for implementing NEPA state, "Under the CEQ regulations, the Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). No specific number of alternatives is required or prescribed. Develop other reasonable alternatives fully and impartially. Ensure that the range of alternatives does not prematurely foreclose options that might protect, restore, and enhance the environment" (FSH 1909.14, page 31). "The range of alternatives considered by the responsible official includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm "(FSH 1909.14.4, page 36).

(95-33) The Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan (also known as the Adaptive Management and Monitoring Plan, or AMMP, appendix E)shows in table 4 that canopy openness will be determined at the fine scale(i.e. group, site and stand), and at the broad scale (i.e. the sub-unit, RU, forest, analysis area, and landscape). The desired conditions are: "Ponderosa pine ecosystems are heterogeneous in structure and distribution at the analysis area scale. Openings and densities vary within the analysis area to maintain a mosaic appropriate to support resilience of individual trees and groups of trees. Ponderosa pine ecosystems provide the necessary composition, structure, abundance, distribution and process that contribute to the diversity of native plant and animal species across the 2.4 million acre 4FRI landscape." Please refer to the DEIS starting on page 124 for the discussion of canopy density and openness for each

	to the creation of regeneration openings within groups, will undoubtedly result in a significantly lower canopy density than was deemed desirable in the Management Recommendations for the Northern Goshawk in the Southwestern United States. Clearly, the USFS 4FRI Team has endeavored to be responsive to this concern, as evidenced in the 4FRI DEIS Appendix G Bridge Habitat, Appendix D Alternative B through D Implementation Plan, and in the silviculture Specialist Report. However, Navajo County is concerned that the issues raised by partner agencies such as the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department, and by a broad range of stakeholders, have not yet been fully resolved. Questions remain about how and at what scale post-treatment canopy openness will be measured, and how group size, basal area (BA), stand density index (SDI), interspaces, regeneration openings, trees per acre (TPA), and quadratic mean diameter (QMD) interrelate to result in a trajectory toward desired future conditions. As previously noted, Navajo County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Further, the County readily admits that it lacks the technical competence to contribute meaningfully to the resolution of arcane technical issues such as density management and the relationship between treatment intensity, tree group density, and overall average density, as relates to the implementation of post-treatment openness. Suffice it to say that the very fact that the discussion continues unabated is concern enough to the County that a zone of agreement has not been reached, or that the issues have not been understood clearly and broadly enough for the emergence of a general zone of agreement. Navajo County understands that differences of opinions will exist regarding desired canopy openness. What concerns the County is the confusion that exists about questions that should be answered with data, such as: - Does science support the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups (within stands)? - How does canopy openness measured at group level compare with the reference condition? - How and at what scale will post-treatment openness be measured in 4FRI? - Does a range of basal area of 50 to 70 in the	alternative, and to page 128 for definition of canopy cover and how it is measured. The implementation plan (DEIS Appendix D) includes a variety of designs that utilize a “read the land” approach. For example pages 616, 619, 622, 624,629, 632, and 634 address design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (DEIS page 654)emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the “red zone” density. The “bridge habitat” analysis (appendix G) was performed to determine if sufficient habitat would exist at the landscape, restoration unit, and mid-scale levels to accommodate the needs of closed canopy-dependent wildlife species post-treatment until desired conditions could be met. Please refer to appendix G in the DEIS for the specifics of how bridge habitat is determined under alternative C – the preferred alternative.
Nez, Jonathan		(95-34) Please see the response to #95-33.

largest treatment categories provide enough flexibility for a full range of treatments, considering other metrics such as trees per acre (TPA), stand density index (SDI), percentage of interspace, and percentage of openings? - How will habitat be provided to closed canopy and high closed canopy dependent species in the post treatment interim between the thinning of their current habitats and the natural development of high and dense canopy cover in the future old growth? Therefore, Navajo County is concerned that the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, may be both a process risk and a social license risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk and social license risk for the 4FRI DEIS potentially caused by the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Navajo County respectfully suggests the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting the science or, if science is lacking, the reasoning backing their decisions to transfer the canopy density guidelines originally designed to be implemented at stand or even forest scale, to groups; 2. Answering specifically the stakeholders' questions regarding the assumptions made in Appendix G Bridge Habitat (for example: percentage of openness at stand level including interspaces and regeneration opening; percentage of existing old growth in old growth allocations; relative higher density of canopy in MSO and goshawk habitats post plan amendments; etc.); 3. Providing qualitative and quantitative 'visual' descriptions of post treatment objectives, including relative proportions and actual sizes of groups, stands, openings, etc., for each treatment type; and, 4. Explaining clearly how openness will be measured post treatments, how it will be monitored, how the monitoring data will trigger adaptive management, and at what thresholds.

Nez, Jonathan

As discussed above, and as analyzed in the 4FRI DEIS, forest plans amendments are technically required for 4FRI to be implemented under the current forest plans of the Coconino and Kaibab national

Nez, Jonathan

(95-35) Please see the response to #95-33. The FEIS will contain an updated and expanded Adaptive Management, Biophysical, and Socioeconomic Plan (also known as the Adaptive Management Monitoring Plan, or AMMP) in appendix E.

(95-36) In the FEIS, the analysis has been updated to clarify methodology and data used for the significance evaluation of plan amendments. Alternative E partially responds to this concern by

forests. These amendments essentially address management actions (mechanical treatments up to 16" or 18" d.b.h., and low-intensity prescribed fire) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs); and (a) resolve the issues of desired percentage of interspace within uneven-aged stands; (b) add the interspace distance between tree groups; and, (c) add language clarifying where canopy cover is and is not measured to facilitate restoration in goshawk habitat (excluding nest areas). The amendments also remove the cultural resource standard that requires achieving a "no effect" determination, and allow for a "no adverse effect" determination. The amendments further remove language referencing monitoring of Mexican Spotted Owl Protected Activity Centers (pre- and post-treatment, population, and habitat), and defer to the U.S. Fish and Wildlife Service the monitoring and design of the treatments in Mexican Spotted Owl protected habitats. Navajo County understands the technical necessity of amending the forest plans and has no specific issue with the concept. However, the County is concerned about the decision of the USFS 4FRI Team to characterize the amendments as non-significant, and to defer 4FRI projects design and monitoring in Mexican Spotted Owl protected habitat to the U.S. Fish & Wildlife Service, without including the U.S. Fish & Wildlife Service monitoring plan and guidelines for projects design in the 4FRI DEIS. The Forest Service Manual provides guidance in Sec. 1926.52 Changes to the Land Management Plan That are Significant as follows: "2) Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period." In the USFS 4FRI Team's own analysis in Appendix B Forest Plan Amendments: "The canopy cover portion of the amendment would affect 139,308 acres (18 %) of all goshawk habitat on the Coconino NF and about 35 % of goshawk habitat within the project area" (DEIS p. 466); and: "The amendment would affect approximately 20 % of all suitable goshawk habitats on the forest and about 27 % of goshawk habitat within the project area" (DEIS p. 482). It is unclear to Navajo County if there is an official percentage threshold for significance in the Forest Service regulations, but it seems that the common understanding of the proposing no forest plan amendments. Alternative E provides a point of comparison to alternatives B-D which do include plan amendments. This concern is also partially addressed with the revised Kaibab NF forest plan. In the FEIS, no plan amendment is proposed for the Kaibab NF in alternatives B-D. The amendments (as proposed in alternative B-D) are consistent with the non-significance direction found in FSH 1926.51. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in southwestern forests and the (Coconino NF) forest plan revision process is affecting ongoing and future analyses. This decision would not impose direction on ongoing or future analyses. The FEIS shows FWS biological opinion mitigation and monitoring items for MSO (appendix J) will be incorporated into the adaptive management and monitoring plan (appendix E).

	word 'significant' - "a noticeably or measurably large amount" (Merriam Webster) - would include 35 % of goshawk habitat within the project area in the Coconino National Forest, or 27 % of goshawk habitat within the project area in the Kaibab National Forest. Citing these two percentages as precisely the reason why "For this reason, location and size (were) determined to be non-significant" (DEIS p. 466 and p.482) seems questionable, unless guided by an agency guideline, in which case a reference would be useful. Additionally, it is unclear how the canopy cover portion of the amendments would affect only 35 % and 27 % of goshawk habitat respectively, although the County speculates that it is related to higher vegetative structural classes (VSS). Further, Navajo County is generally comfortable that habitat restoration and reduction of fire risk are key to improving Mexican Spotted Owl (MSO) habitat quality and, therefore, are aligned with both the current Coconino and Kaibab forest plans, as amended, and the U.S. Fish and Wildlife Service's (USFWS) revised MSO recovery plan (2012). However, the County is concerned that deference of treatments design to another agency (USFWS) without integrating this agency's proposed treatments, or at least guidelines, in the 4FRI DEIS makes it impossible for the 4FRI DEIS Team to analyze the site specific and the cumulative effects of the treatments. Therefore, Navajo County is concerned that the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the inclusion of a USWFS monitoring plan or treatments guidelines, and without the possibility to analyze their effects in the 4FRI DEIS, may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the possibility to analyze their effects in 4FRI, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team request a third party legal review of the Forest Service Manual	(95-37) Thank you for your recommendation.

requirements in, and of the 4FRI DEIS compliance with, Sec. 1926.52 as relates to a determination of non-significance. Navajo County further respectfully suggests that U.S. Fish and Wildlife Service monitoring plan and guidelines for the design of treatments in Mexican Spotted Owl protected habitats be incorporated into the 4FRI DEIS, and that their expected direct and indirect site specific effects be analyzed, presented, and integrated into the cumulative effects analysis.

The adaptation of the stakeholders-developed single document Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) by the USFS 4FRI Team resulted in two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Large Trees Implementation Plan (LTIP) is discussed in the following section Large Trees. Clearly, the focus of the 4FRI stakeholders on old growth protection has been integrated by the USFS 4FRI Team in the 4FRI DEIS. Section C Old Trees Implementation Plan of Appendix D Alternative B through D Implementation Plan captures the essence of the stakeholders' old growth protection strategy: "Old trees would not be cut for forest health issues or to balance age or size class distributions" (DEIS p. 644). Navajo County also observes that, as required in order to comply with the forest plans, old growth allocation in the 4FRI DEIS meets the 20% minimum requirement for vegetative structural stage (VSS) 6 Old Forest; and Appendix D Section B Decision Matrix for establishing tree groups, interspace, and regeneration openings, preserves trees with old tree characteristics. However, Navajo County observes that, past the affirmative statements in the 4FRI DEIS, the actual field decisions are left open to individual judgment. While "human health and safety" (DEIS p. 644) should be a fairly objective criteria, "additional habitat degradation" may be more open to interpretation, as illustrated in Section C Old Trees Implementation Plan itself where the example of prevention of additional habitat degradation involves … road construction! Further, Navajo County also observes that the 4FRI DEIS states that "most sites (allocated to old growth) currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans" (p. 15). Considering that the purpose of allocating acres to old growth forest is to manage

Nez, Jonathan

(95-38)Thank you for stating your concerns regarding the implementation plan. The Large Tree Implementation Plan is incorporated into the project's Implementation Plan and may be found in appendix D of the FEIS.

these acres for the fastest possible growth of existing trees toward VSS 6, there is a high likelihood that mature large trees in VSS 5 may be thinned in order to reduce competition for VSS 6 candidates. This decision also involves personal interpretation and individual judgment calls which may prove socially acceptable or disastrous based on the individual making the decision. Therefore, Navajo County is generally satisfied with the Old Trees Implementation Plan (OTIP) and old growth management objectives stated in the 4FRI DEIS, but remains concerned that its implementation may be a social license risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by a misguided implementation of the Old Trees Implementation Plan (OTIP), may present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Navajo County respectfully suggests that the USFS 4FRI Team include strict and restrictive guidance regarding the possible removal of old growth, including a maximum number of trees removed

Nez, Jonathan

according to appropriate metrics such as possibly: per 10 acre block, per mile, per project, or similar.

Large trees are particularly precious inasmuch as they represent the 'future old growth' necessary to restore the forests of eastern Arizona to an ecologically sustainable condition, and to provide habitat to dense and high canopy dependent species. The old growth 'allocation' requirement of 20% in the forest plan, as discussed in the previous section Old Growth, is a 'paper' allocation and should not be confused with the 'actual' old growth that exists in the lower single digit percentage across the forests, numerically far below the required 20% - or even 10% - and temporally far removed from reaching the required 20%. The deficit of actual vegetative structural stage (VSS) 6 Old Forest is what makes vegetative structural stage (VSS) 4 and 5 Mid-age Forest and Mature Forest important. This reasoning guided Navajo County when it participated to the stakeholders development of the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) that the USFS 4FRI Team

Nez, Jonathan

adapted into two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Old

(95-39) Thank you for your suggestion.

(95-40)Including the stakeholder group-created LTRS (or OGPLTRS) as written would not meet the full purpose of the project; namely, to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity which are based on the need to increase forest resiliency, protect soil productivity, and improve soil and watershed function. An evaluation of a programmatic 16-inch d.b.h. cap concludes that the plurality of stands would trend toward a large diameter, single story, and closed-canopy condition (USDA 2011). The results of such a diameter cap would not meet many of the project's desired conditions as discussed below: • A trend toward a large diameter, single story, closed-canopy forest condition would result in homogeneous vegetation structure at the landscape scale. Structural characteristics would lack a mosaic of interspace, tree groups of varying sizes and forest structure with all age and size classes represented. Forest management under a diameter cap would result in a narrow range of forest structure and composition, thereby limiting future ability to manage for is stored forest condition. For these reasons, the

Trees Implementation Plan (LTIP) is discussed in the previous section Old Growth. The purpose of the stakeholders' large trees retention strategy is to emphasize the retention of large trees (VSS 4 and 5) in order to re-establish the old growth necessary for the ecological sustainability of eastern Arizona forests. However, the large trees retention strategy also includes a series of exception mechanisms that codify the socially acceptable removal of large trees (VSS 4 and 5) with a diameter superior to 16" at breast height (d.b.h.), when their removal is necessary to achieve the ecological restoration objective, to increase heterogeneity, and/or to conserve biodiversity. The stakeholders' document also includes provisions for collaborative adaptive management and collaborative participation to propose decision content, while complying with the statutory retention of the decision making authority by the Responsible Official. Navajo County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) i) does not fully reflect the intent of the stakeholders; and, ii) does not take advantage of the products of the 4FRI collaboration. Specifically: 1. The Forest Service determined that: "The original LTRS did not provide the ability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings category" (DEIS p. 57). In so stating, the Forest Service apparently overlooks the fact that removal of individual large young trees is allowed under the exception mechanism, as required to meet the ecological restoration objective. The stakeholders' intent in constraining the removal of groups of large young trees is to allow the development of future old growth as required in the forest plans, including old growth groups. 2. The Forest Service further determined that: "this would result in a continued imbalance of size classes that would be contrary to the forest plan desired conditions" (DEIS p. 57). In so stating, the Forest Service fails to capitalize on the fact that the 4FRI DEIS already includes several forest plans amendments and that these amendments can address this issue as well. Further, the USFS 4FRI Team does not disclose at what scale the imbalance would occur. Imbalance at group level,or even possibly at stand level, becomes balance at larger scales as groups of VSS 5 purpose and need would not be met on most of the project area. Closed-canopy forests do not allow for the sustainable vigor/growth of old-age trees, Under these conditions, old trees would be subject to density-related mortality. higher bark beetle hazard, and would be more susceptible to high-severity fires.• Closed canopy, single-storied forests are more susceptible to density-related mortality, successful bark beetle attack, and provide conditions conducive to dwarf mistletoe spread and intensification.• A trend toward single story, closed-canopy forest conditions would result in landscape scale homogeneity lacking diversity. Closed-canopy forest conditions do not allow for the sustainable growth of shade intolerant tree species (Gambel oak and aspen). Closed-canopy forest conditions do not provide canopy gaps to support robust understory vegetation for plant diversity.• Closed-canopy, single-storied forest stands are more susceptible to high severity fires and changes to fire regimes, as well as long-term conversion from forested plant communities to shrub- and herbaceous-dominated vegetation types (Savage and Mast 2005).

	future old growth balance large areas devoid of them. 3. The Forest Service also determined that: "The original LTRS would have required the Forest Service to consult with stakeholders should a new exception category be found during implementation (LTRS, page 25). To resolve the potential for Federal Advisory Committee Act (FACA) violations, this consultation requirement was removed" (DEIS p. 57). In so stating, the Forest Service misses an opportunity to take advantage of the MOU signed between the USFS and the stakeholders to address specifically such issues through collaboration in compliance with FACA. Therefore, Navajo County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) is likely to be a significant social license risk for the 4FRI DEIS, and that the risk / benefits analysis of the social license risk vs. the restoration benefits may be unfavorable to 4FRI. Consequently, Navajo County is concerned that the social license risk for the 4FRI DEIS likely caused by the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP), presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Navajo County observes that there are only a mere 5 instances of the word "prioritization" in the 744 page 4FRI DEIS. The County further observes that none of these instances apply to the discussion of the concept of treatments prioritization, for the obvious reason that there is no discussion of treatments prioritization in the 4FRI DEIS, including in Appendix D Alternative B through D Implementation Plan, or in the specialist reports or in the project record. Navajo County also observes that Appendix D Alternative B through D Implementation Plan contains no discussion of timing or sequencing of treatments and that the concept of 'Implementation Plan' seems interpreted in the 4FRI DEIS as 'guidelines to implement' rather than 'action plan to implement' or 'work plan to implement.' The County certainly realizes that minute details of implementation are not a NEPA concern but a contracting management concern.	
Nez, Jonathan	However, the County also posits that the implementation of a management action as far reaching in scope and temporal and	(95-41) Please see the response (95-42) to the suggested action concerning prioritization of treatments.

geographical scale as 4FRI, requires a discussion of timing and sequencing, inasmuch as timing and sequencing of treatments are of a nature to potentially impact significantly the site specific effects of individual treatments and the collective cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects). Further, the concept of 'Strategic Placement' of the treatments, in relation to values to be protected, dominant winds, modeled fire behaviors, etc., is critical in the determination of what treatments are most appropriate, how many treatments are required, what treatment intensities are required, and what is the best distribution between treatment types (mechanical vs. fire). The 4FRI stakeholders worked extensively to produce the Landscape Restoration Strategy for the First Analysis Area (2010) that addressed in detail the concept of geographical and temporal prioritization. This work was further refined with the participation of the USFS 4FRI Team into a classification of High Resource Values (HRVs) and Medium Resource Values (MRVs). Some elements of this work were utilized by the USFS 4FRI Team in the 4FRI analysis process, but the discussion of strategic placement; geographical and temporal prioritization; and, their impact on: number, type, intensity, individual and cumulated effects of treatments, is missing. Navajo County is not inferring the need to re-analyze the location of the treatments. The County is generally satisfied with the map of treatments location. However, because the timely implementation of the restoration treatments is critical to meeting the purpose and needs of the proposed action, the County is concerned that the spatial and temporal sequencing of the treatments may have a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Therefore, the absence in the 4FRI DEIS of spatial and temporal strategic timing and sequencing of the treatments, and integration of the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI EIS. Consequently, Navajo County is

	concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a discussion of strategic placement, spatial and temporal prioritization, and their influence on the number, type, intensity, and individual and cumulated effects of treatments, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting a temporal prioritization of the treatments and a sequenced timeline of implementation for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; 2. Presenting a spatial prioritization of the treatments and the sequenced locations of the treatments, for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; and, 3. Presenting how the temporal and spatial prioritization affect the number of treatments, type of treatments, intensity of treatments, direct, indirect, site specific, and cumulated effects of the treatments.	(95-42) The recommendation to include sequencing of treatments within the environmental analysis is outside the scope of this project. The disclosure of sequencing within a NEPA document is problematic because it binds the agency to a fixed schedule that may not be able to be met due to weather, fires, markets, or other unforeseen circumstances. It would likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS and ROD will not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation is most appropriately addressed in implementation and operations.
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2. Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during implementation; and, 3. Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale analysis not address the issue of continued imbalance of size classes.	(95-43) 1.Thank you for your suggestions concerning further silvicultural analysis. Please refer to the silvicultural specialist's report, Table 123 Section B, Decision Matrix for establishing tree groups, interspace, and regeneration openings. It can be found at: http://www.fs.usda.gov/4fri. 2. The Large Tree Implementation Plan (part of the Implementation Plan, appendix D) modified the stakeholder-created LTRS by removing the requirement for the Forest Service to consult with the group should a new exception occur during implementation. The modified version includes language to address the concern without potentially violating FACA: During implementation (prescription development), if a condition exists that does not the meet the desired conditions included in the large tree implementation plan, no large trees would be cut until the National Environmental Policy Act (NEPA) decision is reviewed by the Forest Service implementation team. The team would decide whether the action is consistent with the analysis and the decision made. This information would be made part of the annual implementation plan checklist/compliance review that is

		recommended by the team and approved by the forest supervisor. 3. Please refer to the Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan (appendix E) for information concerning changes in implementation if evaluation of data demonstrates desired conditions are not being achieved.
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2. Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during implementation; and, 3. Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale analysis not address the issue of continued imbalance of size classes.	
Nez, Jonathan	Fire behavior modeling is a critical part of the 4FRI site specific and cumulative analysis process, and Navajo County appreciates the fact that a major effort was made along the entire 4FRI analysis process, starting well before the DEIS, or even the Proposed Action, to model the cumulative effects of landscape scale restoration treatments on fire behavior. To the County, post-treatments and long term future desired conditions fire behaviors represent much of the 'end game' in 4FRI, as the restoration of a natural regime of regular cool surface fires is fundamental to the long term ecological sustainability of the forests of eastern Arizona. Probably as a consequence of the fact that the 4FRI DEIS does not include a specific treatments implementation plan including timing, prioritization and sequencing of treatments in Appendix D Alternative B through D Implementation Plan (see section Prioritization here above), the fire behavior modeling in the 4FRI DEIS only provides a theoretical modeling based on the unrealistic premise that all treatments would happen simultaneously. This is unfortunate because the fire behavior modeling cannot include accurate canopy characteristics (base height, bulk density and cover) or surface fuel loading for any given large area at any given point in time as a result of some treatments being implemented; some treatments not being implemented yet, with fuel load further increasing and canopy characteristics further degrading; and, some treatments having been implemented, possibly as earlier as a decade earlier, with canopy and fuel loading characteristics at various stages of regrowth. Accordingly, Navajo County is concerned that post-treatment fire behavior as modeled	(95-45) Thank you for your comment. Please see the response to (95-42) about prioritization of treatments.

	may not represent reality, and that the analysis of the cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects) may be tainted. Therefore, Navajo County is concerned that the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, due to the lack of timing and sequencing of the treatments, may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Navajo County respectfully suggests that subsequent to the completion of an analysis presenting a temporal and spatial prioritization of the treatments, the USFS 4FRI Team provide a clear and compelling analysis of the effects of the treatments on fire behavior, presenting annual or bi-annual fire behavior modeling based on the outcome of the progressive implementation of 30,000 acres of restoration treatments annually over the 10 year life of the 4FRI project, and that the impact of this analysis be integrated in the analysis of the number, type and intensity of treatments required to meet the purpose and needs, and the direct, indirect, site specific, and cumulated effects of the treatments.	
Nez, Jonathan		Thank you for your suggestion regarding fire effects analysis. Please see the response to #95-42) concerning prioritization and fire modeling.
Nez, Jonathan	The ponderosa pine vegetation type in the 4FRI DEIS analysis area is dominated by Class 2 functional at-risk 6th level Hydrologic Unit Code (HUC) watersheds on about 451,500 acres or 46 % of the analysis area. Class 3 impaired watersheds represent about 316,800 acres, or about 32 % of the analysis area. Class 1 properly functioning watersheds represent about 220,400 acres, or about 22 % of the analysis area (DEIS p. 107). Per the Specialist report, and as summarized in the 4FRI DEIS, the 4FRI restoration treatments under Alternative B (the Proposed Action) and Alternative C (the Preferred Alternative) are expected to result in an improvement in 23% of Class 2 functioning at-risk watersheds (~104,000 acres), and 42% of Class 3	(95-47) Thank you for your support of alternatives B and C concerning the improvement of watershed functioning.

	impaired watersheds (~133,000 acres), with 28 miles of improved water flow regimes overall, including 19 miles in Class 2 watersheds that are functioning at risk and 9 miles in Class 3 watersheds currently impaired (DEIS p. 114). Navajo County is generally satisfied that the effects of the 4FRI restoration treatments under Alternative B and Alternative C contribute significantly toward the County's objectives as expressed in its plans and policies and in these comments.	
Nez, Jonathan	Navajo County encourages the USFS 4FRI Team to prioritize wherever and whenever possible restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures.	(95-48) Thank you for your suggestion regarding prioritization of treatments.
Nez, Jonathan	During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Navajo County observed that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Additionally, the site specificity verification process revealed that some of the required Geographic Information System (GIS) data tables or layers were not entered into the official project record. Therefore, Navajo County is concerned that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data and may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(95-49) Your concern for the completeness of the project record is appreciated.
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team conduct a systemic and systematic review of all technical data, GIS or other, used in their analysis, and ensures that it is included in the 4FRI project record. The County further suggests that the USFS 4FRI Team use the same methodology of random sampling as used by the	(95-50)Thank you for your recommendation regarding the inclusion of all technical data into the project record.

Nez, Jonathan	DEIS Review Workgroup of the 4FRI Stakeholders Group to statistically verify that all required data is included in the project record. During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Navajo County verified to its satisfaction that the required site specificity as regards current condition, desired future condition, prescribed treatment, and site specific effects has been provided in the USFS 4FRI Team analysis process. However, as stated in the above section Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS, the site specificity verification process with the USFS 4FRI Team evidenced to both the County and the USFS 4FRI Team that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Therefore, Navajo County is concerned that the difficulty to access site specificity information may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the difficulty to access site specificity information, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(95-51) The site-specificity of the analysis was tested by the 4FRI stakeholder group. In response to comments on the DEIS, the stakeholder's wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue (4FRI Stakeholder, 2013 Cara Letter #155).
Nez, Jonathan	As discussed by the Eastern Arizona Counties Organization with the USFS 4FRI Team, Navajo County respectfully suggests that the interactive map presented on the 4FRI DEIS website be developed to allow easy 'point and click' access to site specific information such as, but not limited to, current condition, desired future condition, prescribed treatment, site specific direct and indirect effects, and contribution to cumulative effects, as well as all the technical information regarding all relevant resources as can be conveniently provided. Alternatively, if technical or resource constraints preclude the USFS 4FRI Team to develop the above suggested interactive map, or to make it available to the public, Navajo County respectfully suggests that a 'point and click' function could provide information on how to procure the desired site specific data from the project record.	(95-52) Thank you for your suggestion concerning easier access to site-specific data from the 4FRI website.

Nez, Jonathan	Appendix F Cumulative Effects includes a comprehensive list of the past, current and reasonably foreseeable future projects and disturbances included in the cumulative analysis. These projects and disturbances include vegetation projects (mechanical thinning and prescribed fires); recreation projects; other projects; wildfires; insect and disease outbreaks; and, a short discussion of reasonably foreseeable projects with insufficient information for analysis. The list includes projects located on private, State, national forests and other federally managed lands that lie within, adjacent to and outside of the project area. Appendix F Cumulative Effects does not include a discussion of what the cumulative effects of all the projects are, and only includes a brief synopsis of Authorized Livestock Management; Timber Harvest; and, Post-1996 Vegetation Treatments – Uneven-aged Management, Fire Risk, Restoration, summarized from the Specialists' reports.	(95-53) Thank you for your comment. It states on page 675 of the DEIS (Appendix F – Cumulative Effects) "See the project record for the comprehensive master list of all projects for additional information on each project. Electronic maps that display much more detail are available on the project's Web site or upon request." The project record may be accessed at: http://www.fs.usda.gov/main/4fri
Nez, Jonathan	Chapter 3 Affected Environment and Environmental Consequences addresses extensively the concept of cumulative effects on Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; and, Transportation. However, the format used to discuss the cumulative effects varies considerably from resource to resource. For example, the Soils and Watershed (DEIS p.105-121) and the Terrestrial and Semiaquatic Wildlife and Plants (DEIS p.173-245) sections include fairly comprehensive descriptions of the cumulative effects and of their rationale. Other sections formulate cumulative effects as opinions, or as summary statements that essentially posit that the past or current projects have achieved or are achieving their stated objectives.	(95-54) Thank you for your comment concerning the cumulative effects analysis for each resource area.
Nez, Jonathan	The Cumulative Effects section itself of Chapter 3 is but a two sentence paragraph that states: "A summary of past, present, and reasonably foreseeable management actions and natural disturbances that were evaluated by most resources is located in appendix F. See the project record for the comprehensive master list of all projects and for additional information on each project" (DEIS p. 331). Navajo County is generally satisfied that the list of projects	(95-55) Thank you for your comment. Chapter 2 of the FEIS notes that 4FRI treatment acres overlapping with the Flagstaff Watershed Protection Project have been removed from the 4FRI FEIS analysis.

	considered in the cumulative effect analysis is appropriate, with one notable exception. Since the completion of the 4FRI DEIS, the Flagstaff Watershed Protection Project Proposed Action (PA) has been released (April 2013) and will need to be integrated into the cumulative analysis in the final EIS. Navajo County is generally satisfied that the resource specialists have conducted some form of cumulative effects analysis, and the County realizes that the cumulative effect analysis methodology cannot be identical across resources. However, the County is concerned that the methodologies for cumulative effects analysis are generally not satisfactorily explained, and may be inconsistent in depth and breadth across resources. The County is further concerned that the issue of continuity between the project record, the specialists reports, and the DEIS - already identified regarding site specific effects -may also exist regarding cumulative effects. Therefore, Navajo County is concerned that potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	
Nez, Jonathan		(95-56) Thank you for your comment and concern about the cumulative effects analysis of the DEIS.
	Navajo County respectfully suggests that the USFS 4FRI Team include the Flagstaff Watershed Protection Project Proposed Action (April 2013) in the cumulative analysis in the final EIS. Navajo County further respectfully suggests that each resource section of Chapter 3 Affected Environment and Environmental Consequences include a methodology subsection describing the methodology used for cumulative effects analysis. The County also suggests that the USFS 4FRI Team review methodologies across resources to ensure consistency of depth and breadth of cumulative effects analysis.	
Nez, Jonathan		(95-57) Thank you for your recommendation concerning inclusion of a methodology subsection in the FEIS. Chapter 2 of the FEIS notes that the treatment acres overlapping with the Flagstaff Watershed Protection project have been removed from the 4FRI FEIS analysis.
	Appendix E Alternative B through D Monitoring and Adaptive Management Plan offers brief one or two sentence descriptions of: types of monitoring (ecological, implementation, effectiveness,	
Nez, Jonathan		(95-58) We agree that the adaptive management and monitoring plan in the DEIS was not complete. Please refer to the revised Adaptive Management, Biophysical, and Socioeconomic Plan (appendix

	validation and Collaborative Forest Landscape Restoration Act (CFLRA)); monitoring prioritization, scales, question and indicators; and, a ten line description of adaptive management. Appendix E also includes Table 143 Implementation monitoring questions, indicators, frequency of measurement, data source, and cost; Table 144 Landscape-scale effectiveness desired conditions, indicators, frequency of measurement, data source, and cost; and, Table 145 Effectiveness monitoring plan. However, Navajo County observes that about half of Table 143 Implementation Monitoring is left blank, and for most questions for which the table is not blank, the indicators are crude and the frequency is minimal (typically: annual acres and miles). Table 143 looks more like an annual budgetary reporting table than a project implementation monitoring plan. The quantitative aspect of implementation monitoring seems addressed but the qualitative aspect of implementation monitoring seems largely unaddressed or unanswered. It is surprising that half the table is incomplete, indicating an unfinished product. Navajo County also observes that Table 142 Monitoring scales, is left incomplete inasmuch as it does not include any monitoring scale below the sub-unit for the 4FRI DEIS. This, too, indicates an unfinished product. Further, there appears to be a gap in the effectiveness monitoring plan inasmuch as most of the treatments focus on achieving treatments objectives and desired conditions at the stand or even group level, while most of the effectiveness monitoring appears to be planned at the landscape scale. Navajo County further observes that Table 144 Landscape-scale Effectiveness offers a fairly comprehensive list of desired future conditions: Conservation of Biological Diversity; Ecosystem Resilience; Water and Air Resources; Economics; Social Systems; and, Heritage Resources. However, the indicators listed are macro level indicators and the frequency of measurement is generally annually or every 5 years, and many sections of the table in the “Data Source/Spatial Scale/Cost” column indicate “No numbers provided.” This further indicates an unfinished product. Navajo County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more of an adaptive management decision matrix than an effectiveness monitoring plan.	E) in the FEIS. The adaptive management plan developed collaboratively with our stakeholder partners presents a framework through which the Forest Service is able to respond to new information collected through the monitoring process. Analysis of monitoring data by Forest Service staff and by the Multi-Party Monitoring Board will yield information that will be considered in the evaluation of adaptive management options. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols.
Nez, Jonathan		(95-59) Thank you for your observation.

	Adaptive management is addressed in the following section Adaptive Management.	
Nez, Jonathan	Navajo County is concerned that the 4FRI DEIS, the Specialists reports and the project record do not include a specific 'action plan' or 'work plan' and budget, or funding mechanisms, for the monitoring plan. Although the question of who will monitor, and potential funding sources, are nominally mentioned in Table 141 Monitoring plan tiers, the scale, scope and complexity of 4FRI require addressing these questions in a comprehensive fashion that goes well beyond a passing mention in Table 141. How many man-hours will the implementation of the monitoring plan require? Who will provide these man-hours? How much will it cost? How will it be funded? What are the quality control mechanisms to ensure that monitoring itself - if provided by volunteer (amateur?) third parties - meets required criteria? What mechanisms exist to ensure the integrity of the measures? Further, the reliance on "stakeholders" and "multiparty (monitoring boards)" in the 4FRI DEIS monitoring plan tiers (Table 141, DEIS p. 660) raises questions which are left unanswered regarding the functioning of the monitoring plan. For example: What is the USFS mechanism to utilize third party developed monitoring data to make agency action adaptive management decisions? What are the mechanisms to deal with adaptive management decisions that may be of a nature to significantly alter the management actions identified in the Record of Decision? Etc.	(95-60) A project work plan is developed each year once the Agency receives its budget as appropriated by Congress. Once the annual budget is available, the Forest Service will work with the Multi-Party Monitoring Board to prioritize monitoring activities. All of these questions will be answered in collaboration with the Multi-Party Monitoring Board as set forth in the collaboratively developed AMMP. These determinations cannot be made until we know more about the available annual budget, the funds that can be leveraged by partners, and the specific monitoring protocols developed by the Forest Service and the monitoring board. The Forest Service will continue to consider new peer-reviewed science as it becomes available. The collection of monitoring data through a third party would be coordinated by the multi-party monitoring board in collaboration with the Forest Service. Once the data is delivered, it will be verified and evaluated through by an interdisciplinary team of resource specialists. The results of the evaluation and the implications of potential adaptive management actions will be provided to the deciding official for a final decision. If monitoring indicates that the environmental effects of each action do not exceed the bounds of those disclosed in the environmental document, and the actions serve to move the project towards the desired conditions, the Forest Service can continue implementation as described without the need for new or supplemental NEPA review (FSH 1909.15, 54.1). However, if monitoring indicates that the project is not moving towards the desired condition, the Forest Service will first evaluate design adjustments within the bounds of the management actions already disclosed and analyzed in the environmental document. For example, if the Forest Service were modifying the vegetation within an area according to treatment type UEA25, we may reduce the area occupied by interspace to 25 percent rather than the maximum allowable of 40 percent. In both cases, the treatment type is the same, but the design change may better move the projects towards the desired condition. "In the case that new information or changed circumstances result in environmental impacts of a proposed action not disclosed or analyzed, further interdisciplinary review should occur as described in section 18" (FSH 1909.15,

54.1). Also, please refer to the response to the suggested action comment below, #95-61.

Navajo County is further concerned that the ability of the public to review and comment on the 4FRI monitoring 'action plan' or 'work plan' and budget has been compromised inasmuch as even if the USFS 4FRI Team develops such a plan and budget as an outcome of the comments process, the plan will not be available for public review and comments until a notice of decision is published, unless the USFS 4FRI Team decides to release a second 4FRI Draft EIS (DEIS) or a Supplemental EIS (SEIS). Considering that the 4FRI monitoring 'action plan' or 'work plan' and budget currently do not exist, it is not possible to submit substantive comments on them and, therefore, a potential objection could be ineligible based on 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments.

Nez, Jonathan

(95-61) Thank you for your comments; they have been noted. However it is beyond the authority of the 4FRI project deciding official to alter the objection process. From the Federal Register /Vol. 78, No. 59/Wednesday, March 27, 2013 /Rules and Regulations, 18500, Part § 218.8: "(c)Issues raised in objections must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector, unless the issue is based on new information that arose after the opportunities for comment" (emphasis added).

In contrast, the current Forest Service Manual requirements for Plan Monitoring Program Design (Sec. 1921.51) are extremely specific: "In designing the plan monitoring program, the Responsible Official: 1. Should consider ongoing project and activity monitoring. 2. Should establish and apply a screening process (FSH 1909.12, section 12.1) to ensure that only feasible and meaningful monitoring activities are conducted, and in a manner that is practical and affordable. 3. Should store and manage monitoring data in corporate applications such as Natural Resource Information System whenever the capability exists. 4. Should develop a multi-year monitoring guide that describes protocols, databases, and a monitoring schedule. 5. Shall develop an annual monitoring action or work plan to identify the specific monitoring tasks to be accomplished and the budget and personnel associated with those tasks." Navajo County fully understands that Sec. 1921.51 was initially written to apply at Forest Plan level, and that the 4FRI DEIS is nested at project level within the Coconino and Kaibab forest plans. However, CEQ has made very clear that when mitigation is involved in the NEPA analysis – such as the adaptive management mechanism integrated within the 4FRI DEIS – monitoring is automatically invoked. Therefore, Navajo County is concerned that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and

Nez, Jonathan

(95-62) As you state, the Plan Monitoring Program Design referenced in this comment applies to Land Management Planning (i.e. Forest Plans) and not to project monitoring. Furthermore, "CEQ recognizes that it may not be possible to identify fund from future budgets; however, a commitment to seek funding is considered essential and if it is reasonably foreseeable that fund for implementation of mitigations may be unavailable at any time during the life of the project, the agency should disclose in the EA or EIS the possible lack of funding and asses the resultant environmental effects" (CEQ memorandum 2011). The Forest Service commits to using a portion of its annual funding for monitoring and both the Forest Service and the 4FRI stakeholder groups have committed to seeking additional funds. The updated AMMP clearly states that "budget limitations dictate how much and what type of monitoring can be accomplished. In order to prioritize what monitoring will be accomplished, this plan provides a tiered system for prioritizing monitoring (DEIS Appendix E).CEQ guidance also provides that "agencies have discretion, within the scope of their authority, to select an appropriate form and method for monitoring" and "possible monitoring methods include agency-specific environmental monitoring, compliance assessment, auditing systems (CEQ memorandum 2011). The AMMP was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The

5) in particular; that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised; and, therefore, the 4FRI Monitoring Plan may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular, and that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Navajo County respectfully suggests that the USFS 4FRI Team include in very specific terms: i) quantitative, qualitative and effectiveness monitoring processes; ii) a monitoring 'action plan' or 'work plan' and budget; and, iii) the resources allocation and funding necessary to implement monitoring in the 4FRI DEIS, to ensure that the monitoring of the 4FRI project implementation is quantifiably and qualitatively implemented. Practically, Navajo County suggests a three step monitoring process articulated as follows: 1) Quantitative implementation compliance monitoring. The purpose of the quantitative implementation compliance monitoring is to answer the question: "Was the job done?" While, generally, this assessment is made by the Forest Service contract management team when a contractor is involved, it is suggested that this step becomes the beginning of the process rather than what is often the end of it. Specific quantitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 2) Qualitative implementation compliance monitoring. The purpose of the qualitative implementation compliance monitoring is to

Nez, Jonathan

operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Interested parties may scrutinize the updated monitoring plan and continue to comment. This may occur during the objection period which is designed to allow discussions between the FS and interested parties to explore any changes to the proposed actions. This discussion occurs before the Record of Decision is signed that authorizes project implementation. (95-63) The DEIS identifies design features and mitigation by resource that would apply to any of the action alternatives (DEIS, Appendix C, Table 111, page 565 to page599). Appendix D of the DEIS states, "This implementation plan is designed to be integral to the selected alternative and record of decision (ROD). The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Table 112 to table 115 are checklists designed to monitor compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is also the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired

answer the question: “Was the job done correctly?” The need for qualitative implementation monitoring increases rapidly with the complexity of the actions undertaken. Complex forest restoration prescriptions implemented using designation by description (DxD) or designation by prescription (DxP) create substantial room for interpretation by the operators, and may result in outcomes substantially different on the ground from those intended by the resources specialists who wrote the prescriptions. Verifying that implementation complies not only quantitatively but qualitatively with the management decision is especially important when the third step of monitoring is intended, as effectiveness can only be meaningfully analyzed if the actual treatments outcomes are in compliance with the intended outcomes. Specific qualitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The ‘action plan’ or ‘work plan’ must include, disclose and commit the Responsible Officials to provide the resources and budget required. 3) Multi-tier and multiple scales effectiveness monitoring. The purpose of the effectiveness monitoring is to answer the question: “Do the outcomes of the management decision produce the intended effects?” The need for effectiveness monitoring increases rapidly with the complexity and spatial and temporal scopes of the management actions undertaken, especially in projects where cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions. Landscape scale forest restoration over 2 million acres in 20 years, as endeavored in the 4FRI project, is largely inconceivable without the concept of adaptive management. However, adaptive management is but an empty rhetoric, and any management action and the NEPA analysis thereof is flawed if robust three step monitoring as described here above is not planned and implemented. Specific effectiveness monitoring processes can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The ‘action plan’ or ‘work plan’ must include, disclose and commit the Responsible Officials to provide the resources and budget required. A three functional steps monitoring process

conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions” (DEIS, page 601). Furthermore, appendix E of the FEIS provides a plan for not only additional implementation and compliance monitoring, but also effectiveness monitoring. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoringprotocols.The multi-party monitoring board is developed independently within the stakeholdergroup. If provided prior to publication, a stakeholder developed document outlining the structure of the board can be included in an appendix to the FEIS. As outlined in the collaboratively developed adaptive management and monitoring plan, the multi-party monitoring board will work with the USFS, where appropriate, to oversee monitoring prioritization, implementation, data storage and assessment. Furthermore, the planstates that the stakeholder group (and by association, the monitoring board) will provide adaptive management recommendations to the Forest Service based on the monitoring information collected.

articulated as above can be easily adapted to the three priority tiers identified in the 4FRI stakeholders suggested monitoring plan (2012) and the three monitoring scales identified in Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 660). In presenting the above monitoring process, Navajo County does not intend to propose an alternative to the stakeholders developed Biophysical and Socioeconomic Monitoring for the Desired Conditions of the Four Forest Restoration Initiative plan, but to suggest a framework for the associated monitoring 'action plan' or 'work plan' and budget required under FSM Sec. 1921.51 (4) & (5).

Nez, Jonathan

Navajo County respectfully suggests that the 4FRI DEIS include in very specific terms the requirements for the Responsible Officials to be bound by the findings of multi-party monitoring boards. It is not suggested here that responsible officials surrender their decision making authority to a multi-party monitoring board, or violates the requirements of FACA, but that they should be required to act upon the findings of a multi-party monitoring board in a manner that appropriately addresses the issues raised.

(95-64) As described in appendix E (Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan, also known as the Adaptive Management and Monitoring Plan, or AMMP), the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. The deciding official will then consider potential adaptive management actions and make a final determination. However, the Government cannot surrender its decision making authority to the multi-party monitoring board.

Nez, Jonathan

Navajo County observes that the words 'adaptive management' are used in 61 distinct instances throughout the 4FRI DEIS, and that adaptive management is referred to, throughout the entire 4FRI DEIS, as an integral part of the 4FRI project and as a management tool fully integrated in the 4FRI NEPA process. The County applauds the commitment of the USFS 4FRI Team to adaptive management, as projects on the scale of 4FRI (~2 million acres in 20 years), or even the first DEIS of 4FRI (~1 million acres in 10 years), where direct, indirect and cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions, are largely inconceivable without the concept of adaptive management. However, Navajo County observes that aside from a five line description in the Glossary (DEIS p. 341), and a nine line general description in the Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 661-662), there is no presentation or description in the 4FRI DEIS, the specialists reports or the project record, of the adaptive management process. The entire adaptive management plan for the 4FRI project is described as

(95-65) We agree that the site specific monitoring and adaptive management plan in the DEIS was incomplete. Please refer to Appendix E and the updated AMMP in the FEIS for a more detailed definition of the adaptive management process including clarifying figures and adaptive management activities proposed in response to threshold triggers.

	follows: “Monitoring of alternative management actions provides the data for the adaptive management process. As a result of comparing monitoring results to the predicted outcomes, the plan provides a roadmap for adjusting actions or applying new science as long as the anticipated effects are within the scope of impacts analyzed and disclosed in the EIS and record of decision” (DEIS p. 661-662). The fundamental issues of characterization of system uncertainty through multi-model inference; definition of temporal and spatial scales; indicators selection; analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; identification of thresholds; evaluation of strategic alternatives; amplitude, timing, scale and iteration of corrective actions; etc., are left untouched. Additionally, as mentioned in the above section Monitoring, Navajo County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more an attempt at an adaptive management decision matrix rather than an effectiveness monitoring plan per se. The table includes some indicators, triggers, and adaptive actions based on landscape scale desired conditions, but many adaptive actions applying to macro level desired conditions are “discontinue” or “prohibit until alternative approach is development (sic)” or “increase” or “re-evaluate”. These are binary or vague. In addition, many of the triggers timelines are 5 or even 10 years long, which may be adapted for some resources, but may not allow, for other resources, the identification of trends, and the implementation of adaptive management actions before the entire 4FRI project, or half of it, is completed. Similarly, the few lines of adaptive management narrative are vague and general: “Some of the effectiveness monitoring objectives have adaptive management actions that would be taken if the established thresholds are reached or exceeded. Alternatives B, C, and D have specific adaptive management actions for springs, channels, and roads that have been made part of the alternative (see DEIS chapter 2)” (DEIS p. 662). Navajo County is concerned that adaptive management is only a concept at this stage; that the specialized techniques and processes of adaptive	
Nez, Jonathan	management may not be fully grasped; and that adaptive management has not been truly engineered into the 4FRI project as	(95-66) Thank you for your observations. Please see the response to #95-65.

Nez, Jonathan	an executable management mechanism integral to the 10 year implementation of the 4FRI EIS over one million acres. Further, Navajo County is concerned by the reaction to date of the USFS 4FRI Team to such observations: “Adaptive management is not a NEPA requirement.” The County is concerned that, while it is correct that adaptive management is indeed not a NEPA requirement in the 1982 Planning Rule, it has become one under the 2012 Planning Rule (Forest Service Handbook FSH 1909.12 – 41). Maybe more importantly, the County is concerned that by making adaptive management a key process of the 4FRI NEPA analysis, the USFS 4FRI Team has in effect constrained itself into designing and implementing a true adaptive management process. Therefore, Navajo County is concerned that the absence of a robust adaptive management process, despite the stated reliance on adaptive management to implement restoration treatments on one million acres over 10 years, may present a process risk for the 4FRI DEIS. Consequently, Navajo County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a structured adaptive management plan, presents a consistency gap between the 4FRI DEIS and the County’s objectives as expressed in its plans and policies and in these comments.	(95-67) We agree that the site specific monitoring and adaptive management plan in the DEIS was incomplete. Please refer to Appendix E in the FEIS for a more detailed definition of the adaptive management process including clarifying figures and adaptive management activities proposed in response to threshold triggers. The comment refers to the 2012 Planning rule. Please see the response to #76-4 for information about the relevant rule planning rule under which the 4FRI was initiated. However, the 2012 Planning rule at 36 CFR 219.12 (a) (7) makes clear that “This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity”. In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management.
Nez, Jonathan	Navajo County respectfully suggests that the USFS 4FRI Team develop and include in the 4FRI EIS a robust adaptive management plan that includes standardized processes such as: - Characterization of system uncertainty through multi-model inference; - Definition of temporal and spatial scales; - Analysis of indicators selection; - Analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; - Analysis of thresholds; - Analysis of strategic alternatives; and, - Analysis of amplitude, timing, scale and iteration of corrective actions.	(95-68) Thank you for your suggestions. The adaptive management and monitoring plan was developed in collaboration with stakeholder group through an open and public process. This process involved in-depth multi-party discussions on a wide range of socio-economic and ecological issues. Since its inception, the plan was intentionally designed to be a living document that will adapt over the course of the project as information is gained and new questions are revealed. In January of 2014, the current iteration of the adaptive management and monitoring plan was approved by the 4FRI stakeholder group for inclusion into the FEIS. Your participation in that process is appreciated. We feel that the plan is a robust and well thought out document that establishes the proper framework for the Forest Service to not only monitor the effects of restoration activities, but also adapt as new information as it is made available.
Nez, Jonathan	In its review of the proposed directives revising the Forest Service Handbook (FSH 1909.12) and the Forest Service Manual (FSM 1920),	(95-69) Please see the responses to the individual issues that concern Navajo County below.

Nez, Jonathan	and establishing procedures and responsibilities for implementing the 2012 National Forest System Land Management Planning Regulation set out at 36 CFR part 219, Navajo County identified issues and shortcomings that are likely to affect the 4FRI DEIS. Navajo County fully understands that the opportunity to comment on the 4FRI DEIS is neither an opportunity to comment on the 2012 Planning Rule, nor on its implementation directives. Nonetheless, precisely because the 4FRI DEIS will establish the parameters for all subsequent management actions in the 4FRI project for the upcoming 10 years or more, the County believes that it is appropriate for the 4FRI EIS to specifically include and, therefore, integrate into any subsequent management action, guidelines on: i) how to use of best available scientific information to inform the land management planning process; ii) public participation and the role of collaboration; and, iii) the objection process. Navajo County appreciates and supports the important role given to the use of best available scientific information to inform the land management planning process in the proposed directives and in the 4FRI DEIS. Navajo County further appreciates and supports the important role given to assessing social and economic sustainability and multiple uses in the assessment process. Issue However, Navajo County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials in actually integrating social and economic sustainability and multiple uses, and in integrating social and economic science to the framework of best available scientific information to inform their land management planning process, and their management decision making process. Specifically, the assessment of the social, cultural and economic values becomes essentially an exercise in futility if these values are not reflected in the management decisions, and do not balance other values. This lacking is reflected in the 4FRI DEIS. Navajo County clearly supports robust science and the full integration of ecological, bio diversity, restoration and conservation values in the management process, and the County is on record for participating in, and often leading, efforts designed to re-introduce to the ecosystems of eastern Arizona natural ecologically sustainable processes such as a frequent cool surface fire regime. Nevertheless,	(95-70) Thank you for expressing your opinion. Please see the response to #95-25.

	the County is observing, and when necessary is committed to mitigate, a tendency to develop and implement pure, uncompromised and uncompromising science, or the currently accepted state of best science - which often proves to be a temporary state, to the detriment of the enjoyment, custom, culture, health, safety and economic well-being of the people. Additionally, Navajo County is also observing, and when necessary is also committed to mitigate, the fact that the same temptation to develop and implement pure, uncompromised and uncompromising science, also often causes the weakening of the social consensus with stakeholders who would support the implementation of management decisions based on a balanced approach, but are unwilling to support the invasive implementation of a monolithic and intransigent interpretation of science. For example, many stakeholders are reluctant to support unconditionally the 4FRI DEIS, owing to the science-based decision to cut some of the large trees necessary for the development of the future old growth, in order to create regeneration openings in the name of scientifically driven silviculture. Such decisions may make sense at group level, in forests featuring well balanced classes of vegetative structural stages (VSS), but are difficult to support at stand level or forest level in forests where older VSS classes (VSS 5 and 6) are in recognized deficit at landscape scale, while younger VSS classes (VSS 2, 3 and 4) are overabundant, choke the landscape, and transform it into a ticking fire bomb. Navajo County suggests that the 4FRI EIS provide clear and unambiguous guidelines to responsible officials to integrate social sustainability and social science into the framework of best available scientific information to inform their management decision making process. Specifically, Navajo County suggests that the 4FRI EIS guide responsible officials to implement substantive - even though possibly scientifically imperfect - management actions that move the ecosystems significantly toward the desired future conditions, when such actions are supported by social consensus, rather than spend years attempting to forcibly impose management actions that may be deemed scientifically more perfect but that do not benefit from the support of the social consensus. In other words, the County	
Nez, Jonathan		(95-71) Please the response below to #95-73.

	suggests that the 4FRI EIS emphasize executing well less than perfect projects now, over developing scientifically perfect projects that are not implemented. To quote a famous Arizonan: "Extremism in the defense of liberty is no vice" (Barry Goldwater), but Navajo County would like to propose to the USFS 4FRI Team that extremism in the pursuit of best available scientific information (BASI) may become counterproductive when it results in paralysis by analysis, or inaction by litigation.	
Nez, Jonathan	Navajo County appreciates and supports the important role given to public participation and the role of collaboration in the proposed directives and in the 4FRI DEIS. Issue However, Navajo County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials on two fundamental and overlapping aspects of public participation and the role of collaboration. Specifically: i) sustained and meaningful public participation and engagement require that the public's input actually influence substantially the decision making process; and, ii) sustained and meaningful collaboration requires that the products of collaboration be honored by the Forest Service. This lacking is reflected in the 4FRI DEIS. Navajo County has acquired a long, ineffective, inefficient, unproductive and oftentimes frustrating experience of responsible officials paying lip service to public participation and to the role of collaboration, and the County believes that the 4FRI EIS must focus the concept of public participation and collaboration away from complying with a process and 'managing the problem,' toward developing executable products and 'resolving the problem.'	(95-72) Please see the response below to #95-73.
Nez, Jonathan	Navajo County recognizes that under current federal statutes Forest Service line officers are not allowed to share their decision making authority. Nonetheless, the County believes that a statutory monopoly of decision making authority does not necessarily imply an operational monopoly on decision content. Therefore, the County suggests that the 4FRI EIS emphasize that while the line officers retain their sole legal ability to make the decision, they are also required by law and regulation "to meet the needs of present and future generations" (Forest Service Mission Statement), as expressed through true public participation and collaboration, and meaningful	(95-73) The 4FRI planning effort has lived up to the spirit of authentic collaboration since the inception of the idea to restore 2.4 million acres across northern Arizona. A working relationship was built with the stakeholder's group, and beginning in 2010, collaborative planning efforts include but are not limited to, the use of the stakeholder's Landscape Restoration Strategy to inform the purpose and need and proposed action for this project. In addition, the stakeholder's group produced the Large Tree Retention and Old Growth Protection Strategy which was used to inform alternatives and the modified version is incorporated in the project's implementation plan. The collaborative

	consistency reviews with the local governments' objectives, among other channels. Navajo County further suggests that the 4FRI EIS guide responsible officials in retaining their legal decision making authority while allowing the public to participate meaningfully in, influence substantially, and, when appropriate, contribute to alter the content of their decision.	effort continues with the participation of the stakeholder's group in developing the adaptive management and monitoring plan which is included in the FEIS. Evaluating monitoring information and data gathered about the ecological and socioeconomic components affected by restoration activities creates the feedback necessary for making any adaptive management decisions. As described in appendix E and the AMMP, the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. Because the Forest Service can neither abdicate its legal responsibilities nor delegate decision making to the collaborative group, the deciding official will consider potential adaptive management actions and make a final determination. All collaborative decisions still need to move through procedures for agency evaluation and accountability.
Nez, Jonathan	Navajo County appreciates the attempt made by the Forest Service to: i) allow the public a more effective involvement; ii) support the collaborative processes; and, iii) develop better decision-making (U.S. Forest Service Chief Tom Tidwell) by replacing the previous appeal process with the new pre-decisional administrative review, or "objection process", to be applied under federal regulation to all projects and activities that implement land-management plans and that are documented in an environmental assessment or environmental impact statement. Navajo County acknowledges that the U.S. Forest Service announced on March 26, 2013 the final rule governing the objection process for projects and activities implementing land-management plans, and that the final rule was published in the Federal Register on March 27, 2013 after a review of public comments submitted in response to the publication of the proposed rule in 2012. Consequently, the County fully understands that this comments letter is not an opportunity to comment on the objection process.	(95-74) Thank you for your comment.
Nez, Jonathan	However, Navajo County believes that the recent decision made by the Forest Service to replace the previous appeal process with the new objection process in the 4FRI NEPA process does provide an opportunity to address concerns about the objection process implementation, as follows. Among other significant differences, a critical difference between the previous appeal process and the new	(95-75) Please see the response to #95-61.

Nez, Jonathan	objection process is that an objection must be filed prior to an actual decision being made and published. This creates a potentially difficult situation inasmuch as there is a possibility, and in certain cases a probability, that several objections may be filed by several different parties, and that the resolution of these objections may result in a final decision significantly different from the one disclosed in the document published with the notice of a plan subject to objection. Although the list of objections will be public, the timing of filing of potential objections within the objections filing period may result in the requirement for the public to decide to file, or to abstain to file an objection based on the speculation of what other parties may decide to file, and what the resolutions to such objections might be. Additionally, since a final decision may be influenced significantly by the resolution of an objection that, by definition, happens only after the comments period is closed, parties may be unwillingly put in a situation where, per 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments, their potential objection may be ineligible. Additionally, Navajo County is concerned that Chapter 50 Objection Process in general, section 51.66 - Reviewing Officer Response to Objections and section 51.6 - Resolution of Objections in particular, and specifically section 51.6 paragraph 4: "The reviewing officer responds to the outstanding issues in the objection; The reviewing officer's response may include instructions to the responsible official as part of the disposition of the objection. The response must be sent to the objecting party(ies) by certified mail, return receipt requested, and posted online" (36 CFR 219.57(b) and sec. 51.64) are focused on the administrative process of disposing of an objection, rather than on the substantial process of actually resolving it. Navajo County suggests that the 4FRI EIS guide the reviewing officers to exercise careful judgment in their resolution or rejection of objections, in relation to the true material importance of the objections – as opposed to their symbolic or emotional importance, and the potential effect of litigation on the implementation of the project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' objections,	(95-76) Thank you for your interest in and concern for this restoration project.

	and the major benefits attached to sustaining the 4FRI social license. In so suggesting, Navajo County wants to emphasize that it does not promote indiscriminate and aberrant acceptance of any and all parties' whims or irrational demands, but a well-considered costs and benefits analysis by Forest Service responsible officials, line officers and reviewing officers of public input in their decision process in view of the relative actual significance or lack thereof of such input, and the overwhelming urgency to act, even if imperfectly in some specific cases, such as the protection of the forests of eastern Arizona against catastrophic landscape scale wildfires. In summary, Navajo County wants to re-state its overwhelming support for the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the suggestions provided by the County and other stakeholders integral to the sustainability of the 4FRI social license. Therefore, the concerns and suggestions provided by Navajo County are not aimed at questioning the need to implement 4FRI, but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process that could be of a	
Nez, Jonathan	nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project, as intended by the County. Navajo County is fully aware that per Sec. 1503.4 Response to comments, the USFS 4FRI Team may elect to "Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response" (Sub Sec. 5). However, this is not the expectation of the County. Rather, the County expects that the USFS 4FRI Team will receive the County's comments in the spirit of continuous improvement and risk mitigation in which they were written, and elect to "Modify alternatives including the proposed	(95-77) Thank you for your comments and support of this landscape-level restoration effort.
Nez, Jonathan	action" (Sub Sec. 1), and "Supplement, improve, or modify its analyses" (Sub Sec. 3) as allowed for under Sec. 1503.4. Navajo County respectfully submits that the above comments and suggestions are substantive in nature and warrant careful	(95-78) Your comments have been noted. Thank you for your involvement in the 4FRI DEIS comment process.
Nez, Jonathan	consideration and adoption by the Forest Service. Navajo County requests to be kept informed as the 4FRI NEPA process progress;	(95-79) Thank you for your comments.

	hereby reserves its right to provide further comments as the process unfolds; and, requests that the Forest Service commit to receiving and integrating further comments from the County as provided. Navajo County appreciates the opportunity to comment on the 4FRI DEIS and thanks the USFS 4FRI Team for this opportunity. The County is committed to partner with the U.S. Forest Service to meet the County's residents' and visitors' enjoyment, custom, culture, health, security and economic well-being needs.	
Nidess, Rael	It appears that the level of concern for the survival of the Spotted Owl evident some years ago has now been replaced by concern over so-called 'restoration' of the 4 involved forests but, if prior behavior is predictive of future behavior, 'restoration' is usually a euphemism for 'development', which is, in turn, a euphemism for increased logging, the development of the roads necessary for logging [so-called 'salvage' logging in this case, akin the the 2002 Biscuit Fire controversy] , and the utter destruction of the native ecosystem. If this is case, than I vote for action #1: Do nothing.	(3-1) Thank you for your comment. Alternative A, No Action, addresses your recommendation.
Nidess , Rael	I have reviewed the DEIS for the Four Forest Restoration Initiative Project. Please accept these comments. The American public does not want 607 square miles of national forest land to be logged anywhere in Arizona over any time-period. We use our national forests for recreation. We don't want them trashed to provide opportunities for short-term corporate profit. There is no shortage of raw materials for wood and paper products in America. There is simply no reason to log the national forests. The American public does not want 517 miles of new road to be constructed in the Coconino, Kaibab, Tonto and Apache-Sitgreaves National Forests. There is currently enough existing road in all national forests to circle the globe 11.5 times at the equator. Road construction should stop on all national forests.	(17-1) Thank you for your comment. The purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5). The project is expected to move almost 600,000 acres toward comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects (web-based DEIS, page 9). Alternative A responds to your comment (web-based DEIS, page 62).
Nielsen, Erik	The region north of I-40 behind Bellemont Meadows subdivision is predominately dog hair thickets on steep slopes. The treatments proposed for the stands look appropriate for the current conditions and desired conditions however this area should be prioritized for implementation in the first year of 4 FRI. The residential areas are at risk from fire and more imporantly post fire flooding. This is a priority concern of the Bellemont Meadows HOA.	(50-1) Thank you for your comment. The area described is included in this analysis and proposed for treatment.

Nielsen, Erik	Please include the stands around the Flagstaff MEadows subdivision in Bellemont on the North side of I-40 for treatments in the first year of implementation. The stands above the subdivision are doghair and homes are at risk from both fire and post fire flooding. The treatments planned for the stands around the subdivision look appropriate to the current condition and the desired condition.	(51-1) Thank you for your comment. The area described as being adjacent to the Flagstaff Meadows subdivision and within the WUI is included in this analysis and proposed for treatment.
odin, jane	Efforts to post this on the Cara system failed because it kept throwing it out for unknown errors. Typical! This project to burn over a million acres of forest land after reaping benefits from selling 300 thousand acres to lumber companies is one of the most incomprehensibly evil projects I've encountered in my lifetime. Your 4FRI project is another of the "new" so called scholarly environmental interventions designed to return the landscape to the way you figure it was back at the turn of the century etc. What a bunch of bull crap.You redesigned the waterways throughout the west with disastrous results. You redesigned the grasslands of the Midwest and created the great dust bowl disaster and on and on it goes. I'm certain you're aware of the catastrophic history of the Army Corp of Engineers and others like the Forest Service. It's too, too unfortunate that the pencil pushing engineers of this destruction won't be on the front lines of the great burns, sucking up the poisonous smoke all the southwest will be forced to endure. Too bad you have no regard for the wildlife population that will suffer horribly through loss of habitat and smoke inhalation and for what. This is supposed to be the people's land - we have not given our permission for this horror to ensue, nor will we benefit from the $$the government will gain. I would rather die in the gutter than work for or be associated with an organization so diabolically evil.	
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Page, Jennifer	Please do not burn these forests. The natural growth in these forests are Not weeds they support the eco system of the forest. Natural lands are to be preserved in their natural state so they can grow as they have for centuries. There are so little resources left that we do not need to destroy these too. The burning disturbs and kills off wildlife that is important to keep the eco system balanced. An apple farmer in Japan found that letting the natural weeds grow under the trees did not choke out his trees, but made them healthier. The good bugs fed on the weeds and then killed the bad bugs. This burning of the forest is bad for the environment in so many ways aside from destroying the forest, which has been fine for thousands and thousands of years without any man made fires. If there are any problems in the forest eco system, they are caused by outside pollutants. Burning the forest only makes the problem worse. Burning these forests is Senseless destruction of wilderness. Please don't do it.	

		(proposed action). The DEIS at page v only states prescribed fire would be reduced by 30 percent. This is incorrect and has been corrected in the FEIS. Prescribed fire (pile, broadcast, and jackpot burning) would occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. Coordination with ADEQ would take place through the Kaibab and Coconino NF Zone Dispatch Center and the prescribed fire Burn Boss (web-based DEIS, FE2, page 568). Emission reduction techniques (ERTs) that are recommended by Arizona ADEQ would be utilized when possible to minimize impacts to sensitive receptors (including communities) of burn unit(s) (web-based DEIS, FE3, page 568). Please see the wildlife section in chapter 3 of the DEIS and the wildlife report for the environmental consequences associated with wildlife and the use of prescribed fire. Overall, there would be short-term adverse impacts for some individuals but long term benefits from improved habitat conditions.
parker, carol	I am against the Forest Service project of "thinning" and burning forests in Arizona. I am aware of the damage this does to habitat for spotted owls and other birds and animals. In addition, the forest service needs to evaluate to what extent this project is being done out of greed (selling off 300,000 trees).	(124-1) Thank you for your comment.
Pearson, Yvonne	Greenlee County is located in eastern Arizona along and beneath the Mogollon Rim that marks the southern edge of the Colorado plateau.Greenlee County has been a stakeholder in the effort to develop and implement landscape scale forested ecosystems restoration for the last decade and has been involved in the creation of the White Mountains Stewardship Project; the Governor's Forest Health Council's Statewide Strategy for Restoring Arizona Forests; the collaborative Analysis of Small-Diameter Wood Supply in Northern Arizona; and,what has become the Four Forest Restoration Initiative. Greenlee County appreciates the opportunity to comment on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative, and would like to offer the following comments,gap analysis and suggested actions.For ease of reading, Greenlee County comments have been organized in chapter form, and a table of contents is inserted on the following page to facilitate the navigation of the document. Greenlee County's Objectives as Expressed in its Plans and Policies Greenlee County ("the County") is	(158-1) Thank you for your explanation of the positioning of the 4FRI project within Greenlee County and the concerns of the County regarding 4FRI's activities.

Pearson, Yvonne	located in eastern Arizona along and beneath the Mogollon Rim that marks the southern edge of the Colorado Plateau. Five characteristics of the County are particularly relevant to the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative ("the 4FRI DEIS"): 1) One of the four national forests regrouped into the Four Forest Restoration Initiative ("4FRI"),the Apache-Sitgreaves National Forests, is located within Greenlee County. 2) The Apache-Sitgreaves National Forests occupy a very large proportion (64%) of the area of the County. 3) The landscape scale catastrophic wildfires in the national forests of the Southwest have a disproportionately large impact on the ecological, social and economic life of Greenlee County and the neighboring eastern Arizona counties, and on the health and safety of their residents and visitors. Four of the five largest wildfires in Arizona, including two of the largest wildfires in the nation, have occurred within the five counties of the Eastern Arizona Counties Organization in the last decade: the Rodeo Chediski Fire of 2002 that consumed 460,000 acres; the Willow Fire of 2004 that burned 120,000 acre; the Cave Creek Complex Fire of 2005 that blazed through 244,000 acres and the Wallow Fire of 2011 that charred 538,000 acres. 4) Outdoor recreational activities conducted in the 4FRI national forests, such as, but not limited to, camping, motorized recreation, hunting, fishing, hiking, etc. by the local residents, and by visitors to the County recreating from metro Arizona to the Rim Country, have a disproportionately large impact on the economic well-being and the economic development of the County. 5) The County has made a long term commitment to proactively participate in, assume leadership roles in and provide political support at the state and federal levels for forest restoration and wildfire prevention efforts at local and landscape scales, such .as the White Mountain .Stewardship Project and the Four Forest Restoration Initiative that the County has been instrumental in creating and fostering. As such, Greenlee County has a special interest in the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative.While Greenlee County recognizes that it is only one of the many constituents of the U.S. Forest Service,and does not seek special consideration in the current comments and review process,	(158-2) Thank you for your comments.

	we urge the Responsible Official to pay careful attention and give due consideration to the following comments in view of the uncommonly large effect that Forest Service land management decisions regularly have directly, or may occasionally have indirectly, on the County' residents and visitors' enjoyment, custom, culture, health, safety and economic well-being. Greenlee County has been uniquely involved in: Developing the concept of industry funded landscape scale restoration in Arizona; Fostering the collaborative agreement that resulted in the 4FRI project; Organizing the political support at the state and federal levels that made 4FRI possible;· Lobbying for the funding of landscape scale restoration in general, and 4FRI in particular, through the Collaborative Forest Landscape Restoration Program (CFLRP); and, Resolving regulatory issues with the U.S. Department of Agriculture (USDA) and the U.S. Forest Service Washington Office (USFS WO), such as the cancellation ceiling issue, which hindered the implementation of industry funded landscape scale restoration. Greenlee County, therefore, understands particularly well the issues at hand, the management processes engaged, the desired future conditions, and the difficulties and challenges involved. The County appreciates fully the USFS 4FRI Team's intent to: i) ensure an adaptive management planning and implementation process that is inclusive, efficient, collaborative and science-based to promote healthy, resilient, diverse and productive national forests and grasslands; ii) support natural resources based rural economic development and employment; and, ii) ensure the enjoyment of the 4FRI national forests by the current and future generations in a balanced approach of preservation, conservation and sustainable exploitation of the natural resources. In a spirit of continuous improvement, and based on the direct practitioner knowledge and experience gained through a uniquely long, diverse, often productive and sometimes difficult participation in the Forest Service planning and implementation processes, Greenlee County would like to share its comments, its appreciation for the obvious work put into the 4FRI DEIS, and its concerns and suggestions as follows.	
Pearson, Yvonne	Role of Greenlee County in the 4FRI DEIS Process Greenlee County recognizes that the 4FRI DEIS is a Forest Service-driven technical	(158-3) Thank you for your comment.

process, and generally supports the analysis mechanisms deployed by the USFS 4FRI Team to complete the assessment and the technical part of the planning. Although Greenlee County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as an organization representing the most direct and local expression of democratic government at the individual district or national forest level, the County more generally defines its role at the policy-making level as it relates to public lands management processes. Therefore, although several of the following comments do apply to the technical aspects of the 4FRI planning processes, they purposefully do not address specific technical mechanisms thereof, and Greenlee County is mostly satisfied that the USFS methodology is generally satisfactory, and that the studies that the USFS 4FRI Team in their expertise deem reliable, are adequate to support their technical conclusions (Lands Council v. McNair 537 F.3d 981- 9th Cir. 2008). Therefore, Greenlee County will focus its engagement in the 4FRI DEIS process, and its comments and suggestions, at the policy-making level and on whether the 4FRI Preferred Alternative contributes to the County's residents' and visitor's enjoyment, custom, culture, health, safety and economic well-being. The County will further focus its engagement on whether the 4FRI Preferred Alternative is consistent with the objectives of the County as expressed in its plans and policies; on how the 4FRI project impacts related planning efforts by the County; and, on the compatibility with and interrelated impacts of the 4FRI project and the County's plans and poliCies.

Per the requirements contained in the 2012 Planning Rule, Title 36 - Parks, Forests, And Public Property,Part 219 - Planning, Subpart A - National Forest System Land Monagement Planning, Section 4 - Requirements for public participation, subsection (b) Coordination with other public planning efforts,Greenlee County expects that: "The responsible official shall coordinate land management planning with the equivalent and related planning efforts of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments" (36 CFR 219.4 (b)(l)).

Pearson, Yvonne

(158-4) Thank you for referencing the 2012 Planning Rule. This project has been reviewed against the direction in the current “Coconino National Forest Plan” (forest plan), as amended (USDA 1987), the “Land and Resource Management Plan for the Kaibab National Forest, as revised” (USDA 2014) and 36 CFR 219.17(b) (3). For clarification, this project has proposed three nonsignificant forest plan amendments for the Coconino NF. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) provides the transition language that allows this project to propose

	Greenlee County further expects that: "The results of this review shall be displayed in the environmental impact statement (EIS) for the plan", and that "this review shall include consideration of: (i) The objectives of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments, as expressed in their plans and poliCies; (ii) The compatibility and interrelated impacts of these plans and policies; (iii) Opportunities for the plan to address the impacts identified or to contribute to joint objectives; and, (iv) Opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives" (36 CFR 219.4 (b)(2)). Greenlee County posits that these statutory requirements are meant by Congress to imply more than a perfunctory review process resulting in a check mark in a 'coordination box' and imply a sincere and proactive resolution effort to reduce and resolve potential conflicts between aspects of 4FRI DEIS and objectives expressed in the County's plans and policies; such as, but not limited to, those relevant to forested ecosystems restoration and catastrophic wildfire prevention objectives, watersheds restoration objectives, rangelands resources management objectives, or forest products resources management objectives. Greenlee County is committed to resolve or reduce potential conflicts between the 4FRI DEIS and the County's plans and policies, and understands that such resolution must take place within the context of developing the 4FRI project's desired conditions or objectives. To this effect, it is the intent of Greenlee County to avail itself of the opportunity contained in the 2012 Planning Rule that specifies that: "Where appropriate, the responsible official shall encourage States,County, and other local governments to seek	amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule.
Pearson, Yvonne	cooperating agency status in the NEPA process for development, amendment, or revision of a plan" (36 CFR 219.4 (a){l){iv)). The County's policy making decisions and management actions are guided by the County plan. This plan guides the actions of the Board of Supervisors and the County staff toward meeting the present and future enjoyment, custom, culture, health, safety and economic well-	(158-5) Please see the response to #158-4 for information regarding the relevant planning rule under which 4FRI was initiated. (158-6) Thank you for your comments. The comments from Greenlee County, as well as other comments received during the official comment period, have been read, reviewed, and discussed by the 4FRI specialists. A summary of responses by topic will be part of the FEIS. The
Pearson, Yvonne	being needs of the County's residents or visitors. The County planning effort integrates the principles of: 1) Monitoring the effects	complete individual comment analysis will be posted on the project's website and filed in the project record. The Forests have collaborated

	and impacts of the implementation of the County policies, as well as the direct, indirect, individual and cumulative effects and impacts on the County and its residents and visitors of the policy decisions and management actions taken by state and federal agency partners; 2) Monitoring all demographic, social, economic, cultural and other variables, whether internal or external, which are relevant to the County's policy making decisions and management actions; and, 3) Dynamic and generally informal adaptive management. As such, the County plan is an evolving dynamic plan that constantly adapts, often informally, in response to the evolving ecological, economic, social and cultural environment, and that is formulated as much through the regular deliberations of the County's Board of Supervisors and the resulting Resolutions of the Board, as it is in the formal planning documents. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies 136 CFR 219.4 Ib)), the County plan defined as the accumulation of the formal County planning documents and the County public record of Board of Supervisors deliberations and resolutions, is hereby entered into the 4FRI NEPA record. Greenlee County appreciates and supports the extensive and thorough analysis performed by the USFS 4FRI Team for the 4FRI DEIS, and the discussion of the effects of the no action alternative and the three action alternatives on: Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; Transportation; Climate Change; Short-term Uses and Long-term Productivity; Unavoidable Adverse Effects; Irreversible and Irretrievable Commitments of Resources; and, Cumulative Effects. Multiple resources analyzed individually by the USFS 4FRI Team in the 4FRI DEIS are regrouped in a smaller number of overarching natural resources management policy objectives by the County. In no particular order, the County's natural resources management objectives relevant to the 4FRI DE IS comments include:	with 4FRI stakeholders and interested publics including the Eastern Counties Organization. The DEIS (chapter 1) and FEIS (chapter 1) documents how collaboration was used during the planning process.
Pearson, Yvonne	1) Rangelands Resources Management Objectives. Rangelands Resources Management Objectives address issues such as, but are	(158-7) Thank you for the explanation of how the resources were regrouped for Greenlee County's analysis of the 4FRI DEIS.

not limited to, grazing availability, suitability, sustainability; ecological, economic and social carrying capacity; access; contribution to rural economic development; and, contribution to local Western custom and culture. 2) Forest Products Resources Monagement Objectives. Forest Products Management Resources Objectives address issues such as, but are not limited to, logging availability, suitability, sustainability, productivity, access; contribution to rural economic development; and, contribution to rural Western custom and culture. 3) Minerol and Energy Resources Management Objectives. Mineral and Energy Resources Management Objectives address issues such as, but are not limited to, the availability, suitability, sustainability, productivity, access, and contribution to rural economic development of (a) solid, liquid or gaseous mineral resources and (b) solar, wind, hydropower, geothermal and other natural renewable energy resources. 4) Motorized Trovel and Recreation Management Objectives. Motorized Travel and Recreation Management Objectives address issues such as, but are not limited to, motorized access; motorized travel; motorized big game retrieval; motorized dispersed camping; motorized gathering of firewood; motorized access to dispersed fishing; motorized recreation opportunities; inventoried road less areas; wilderness area designation; motorized access to grazing and logging opportunities; contribution of motorized access, recreation and travel to rural economic development; and, contribution to local Western custom and culture. 5) Forested Ecosystems Restaration and Catastrophic Wildfire Prevention Objectives. Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives address issues such as, but are not limited to, protection of County's residents and visitors; protection of collective and individual real properties; protection of transportation, energy and water collection and distribution infrastructures; ecological restoration of forested ecosystems; local scale restoration projects; landscape scale restoration projects; social license required for the non-conflictual and non-litigious implementation of restoration efforts (such as the one requested in public statements by former USFS Southwestern Regional Forester Corbin Newman for the Four Forest Restoration Initiative); industry development required to

	implement and fund restoration efforts through economically viable utilization of the wood products; and, long term guarantees of wood supply necessary to attract private investments in a small diameter utilization infrastructure in northeastern Arizona. 6) Watershed Restoration Objectives. Watershed Restoration Objectives address issues such as, but are not limited to, ecological restoration of watersheds; protection and development of water collection and distribution infrastructures; monetization of watershed ecosystem services; downstream consumption contribution to upstream production investments and maintenance; and, interactions between watershed functions and multiple use functions. 7) Management Areos Designation Objectives. Management Areas Designation Objectives address issues such as, but are not limited to, the nomination, designation, and management of (a) inventoried roadless areas (which are technically not management areas per se but are an administrative designation) and (b) wilderness areas, primitive areas, research natural areas, wildlife quiet areas, and wild and scenic rivers; and, effects on socioeconomic resources and impacts on the other County objectives. Greenlee County understands that some of these objectives are not directly relevant to the 4FRI DEIS inasmuch as, for example, the 4FRI alternatives are not contemplating the designation of management areas. However, most of these objectives are relevant to the 4FRI DEIS, inasmuch as the 4FRI alternatives either have direct effects on some County's objectives, such as Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives; Forest Products Resources Management Objectives; Watershed Restoration Objectives; and, Rangelands Resources Management Objectives; or, may have indirect effects on some County's objectives, such as Motorized Travel and Recreation Management Objectives. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), this document: Greenlee County comments on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative is hereby incorporated into the County's expressed plans and policies. Greenlee County, therefore, expects that: i) the Responsible Official	(158-8) For clarification, this analysis will not make grazing authorization decisions. This analysis will not be determining whether a road or route will be closed or part of a designated, transportation system. Those decisions occur in travel management-related analyses. (159-9) Thank you for your comments. We have collaborated with the counties since the project was initiated. Since the counties have been part of the 4FRI stakeholder group, we have considered comments received from all publics, including the stakeholders.
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	shall coordinate land management planning with the County equivalent and related planning efforts (36 CFR 219.4 (b)(1)); ii) the consistency review and coordination action shall include consideration of the objectives of the County as expressed in its plans and policies; and, iii) the Responsible Official shall consider opportunities to resolve or reduce conflicts, should some arise between the 4FRI DE IS and the County's objectives (36 CFR 219.4 (b)(2)).	
Pearson, Yvonne	Per the requirements of 36 CFR 219.4 (b)(2), 40 CFR 1502.16(c) and 40 CFR 1506.2, Greenlee County hereby requests that the results of the consistency review and coordination action between the 4FRI DEIS and the County's objectives as expressed in its plans and policies shall be displayed in the Four Forest Restoration Initiative Environmental Impact Statement.	(158-10)Thank you for your comments. All comments received on the draft EIS from Federal, State and local agencies have been included in appendix I of the FEIS on pages 925 to 994. This satisfies Section 102 (c) of NEPA which states, comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public. Although the project only directly affects Coconino County, comments from the Eastern Arizona Counties Organization has been included to reflect similar comments received from Apache, Gila, Graham, Greenlee and Navajo County. Per 40 CFR 1503.4, summarized responses to comments received on the draft EIS are included in this appendix. They have been organized by topic. All comments received on the draft EIS are available for public review at: https://cara.ecosystem-management.org/Public/Letter/172405?project=34857. All comments received were reviewed and responded to individually. The complete comment analysis and response document is located in the project record and is available on the project's website at: http://www.fs.usda.gov/main/4fri/planning.
Pearson, Yvonne	Greenlee County appreciates and supports the fact that all three action alternatives include a clear priority for restoration treatments (PDEIS p. 62).	(158-11) Thank you for your comment. For clarification, the DEIS was not programmatic but site-specific. We assumed the (PDEIS) reference in this comment was to a programmatic document.
Pearson, Yvonne	Constraint on Greenlee County and the 4FRI DEIS Planning Efforts Greenlee County recognizes that the issues of forested ecosystem restoration and forest products management are fundamentally different, and are typically not discussed simultaneously in ecosystems non-departed or little departed from characteristic reference conditions. However, as the Forest Service and the County both generally acknowledge: current conditions in the forested	(158-12) Thank you for this information.

	ecosystems and especially in the ponderosa pine and dry or wet mixed conifers-dominated forests of eastern Arizona are considerably departed from reference conditions, and at risk of continued uncharacteristic disturbances such as landscape scale catastrophic crown fires or insect infestations. Also, Greenlee County acknowledges and appreciates the efforts made by the Forest Service, and particularly the Arizona national forests, to pioneer larger scale restoration efforts such as the White Mountains Stewardship Project. The County has been and continues to be supportive of the White Mountain Stewardship Project and of its funding as a practical tool to initiate larger scale treatments and to incentivize the creation of a small diameter trees utilization infrastructure. Simultaneously, the County acknowledges that the model of subsidized restoration treatments is not scalable at landscape level, as is required to restore the forests of Arizona, for lack of agency funding. As proposed in the Four Forest Restoration Initiative, an initiative that the County was instrumental in creating, fostering and developing, landscape scale forest ecological restoration appears currently feasible only if it is funded by the economically viable utilization of the forested byproducts of restoration by private industry. While it is actually not a novation when it comes to forest products, as timber sales have been for centuries an established form of natural resources valuation and have funded the management of the resources, the concept of ecosystem services monetization is relatively new to the discussion of ecological restoration funding, and its full implications are still being tested. As a consequence, Greenlee County suggests that both the County and the USFS 4FRI Team operate under a very specific constraint when it comes to forest restoration, inasmuch as the forest products industry in Arizona is the funding mechanism for landscape scale restoration in eastern Arizona, which imposes the concept of social acceptability or 'social license' for appropriate scale industry to fund restoration logging activities at the landscape scale throughout the 4FRI project.	
Pearson, Yvonne	Greenlee County's Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives for the upcoming planning cycle include, among others: 1) Design and implement	(158-13) Thank you for your explanation of Greenlee County's objectives for the upcoming planning cycle.

	landscape-scale, consensus-based, industry-supported, accelerated community protection and forested ecosystems restoration in the 2.4 million acre ponderosa pine and mixed conifer-dominated forests of the Mogollon Rim. 2) Develop and sustain the social license required by Southwestern Regional Forester Corbin Newman as a prerequisite to the implementation of industry-supported landscape scale restoration. 3) Participate actively in the NEPA process, as a member of the public and as a Cooperating Agency, and provide robust comments to the Forest Service to ensure NEPA process integrity and survivability in the face of potential threats of litigation. Emphasize with the Forest Service a strategy of risk mitigation and focus on the end goal of accelerated restoration over partisan debates and exclusive focus on technical sciences to the detriment of social science and social license. 4) Create in eastern Arizona the wood supply conditions for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 5) Wherever and whenever possible, prioritize forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona with multiple industrial scale new investments.	
Pearson, Yvonne	Greenlee County appreciates and supports the fact that all three action alternatives include a clear focus on mechanical restoration treatments yielding forest products (POE IS p. 62).	(158-14)Thank you for your comment. As noted, the DEIS socioeconomic analysis (web-based DEIS, pp. 272-284) evaluated the direct and indirect economic output for each alternative.
Pearson, Yvonne	The inherent challenge faced by Greenlee County and the USFS 4FRI Team is that the priorities typically considered when managing forest products, such as a sustained yield of harvest volumes on a regulated non-declining even-flow basis for the long term, uneven age structures, long term sustained yield capacity (LTSYC), non-declining allowable sale quantity (ASQ), etc., are augmented and complicated, and to a large extent superseded, by the overwhelming priority to	(158-15) Thank you for your comment.

Pearson, Yvonne	complete landscape scale restoration as rapidly as possible for fear of massively disruptive landscape scale catastrophic crown fires and/or landscape scale insect or disease infestations. Owing to the fact that for the foreseeable future green forest products will likely be byproducts of restoration treatments, and green forest products will likely continue to be at risk of destruction by catastrophic fires if landscape scale restoration is not expeditiously implemented, the County suggests that forest products management actions for the upcoming planning cycle must be dictated not only by traditional silviculture science and best practices, but primarily by the absolute priority of implementing landscape scale restoration as expeditiously as possible using mechanical treatments that produce the forest products necessary to not only sustain the existing forest industry in the White Mountains, but also to allow robust natural resources-based rural economic development through the creation of an entirely new infrastructure of small diameter trees utilization at industrial scale.	(158-16) Thank you for your suggestion.
Pearson, Yvonne	Greenlee County's Forest Products Resources Objectives for the upcoming planning cycle include, among others: 1) Create in eastern Arizona the wood supply conditions necessary for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 2) Sustain in the White Mountains the wood supply conditions necessary for the continued development and growth of the existing local industry, with expanded economically viable small diameter trees and residual biomass utilization facilities capable of funding the initial ecological restoration thinning of at least 15,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 3) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for sustained yield of harvest volumes on a regulated, non-declining even-flow basis for	(158-17) Thank you for the information.

	the long term, to the overriding priority of implementing as expeditiously as possible landscape scale restoration based primarily on mechanical treatments producing forest products. 4) Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for uneven age management to the overriding necessity of sustaining the social license required to implement landscape scale restoration expeditiously and in a non-conflictual and non-litigious manner, as relates to the protection of old growth and the retention of large trees (upcoming old growth) where vegetative structural stages (VSS) 5 and 6 are deficient at stand or forest scale.	
Pearson, Yvonne	Greenlee County appreciates and supports the analysis performed by the USFS 4FRI Team using the Watershed Condition Framework (WCF) to identify 6th level Hydrologic Unit Code (HUC) Class 1 (Functioning), Class 2 (Functioning-At-Risk) and Class 3 (Impaired) watersheds in the 4FRI project area, and to analyze the direct and indirect effects of the 4FRI project on water quality and water yield.	(158-18) Thank you for your comment regarding the watershed framework.
Pearson, Yvonne	Uncharacteristic landscape scale forest crown fires in eastern Arizona have a demonstrated negative impact on the conservation and operation of the watersheds in which they occur. In addition to the damages caused to communities and ecosystems by the fires themselves, the most common negative effects on watersheds documented after the Rodeo-Chediski Fire, the Wallow Fire, in some areas, and the Schultz Fire, among others, are: uncharacteristic runoffs, catastrophic flooding, accelerated and aggravated soil erosion, streams and reservoirs sedimentation, and long term severe disturbance of the watershed functions.	(158-19) Thank you for your comment concerning the effects of high-severity fire on watershed functions.
Pearson, Yvonne	The Rim Country constitutes a large portion of the watersheds that contribute significantly to the water supply of the metro Arizona and greater Phoenix area. The threat of additional uncharacteristic landscape scale forest crown fires in eastern Arizona, especially on the south slopes of the Mogollon Rim, raises serious concerns about the conservation and operation of the eastern Arizona watersheds. Additionally, the specific risk to the East Clear Creek watershed poses an existential threat to the Town of Payson's water supply. With the growing realization that uncharacteristic landscape scale forest crown fires affect the conservation and operation of the watersheds	(158-20) Thank you for your explanation of Greenlee County's role in watershed restoration on the Mogollon Rim.

Pearson, Yvonne	in which they occur, efforts to protect watersheds have recently been initiated in the Southwest. Several of these efforts focus on the monetization of the ecosystem services provided by the watersheds, and on an attempt to enroll the financial contribution of the downstream beneficiaries of the services (water consumers in this case) to the financial costs of protecting the upstream provider areas and the utility corridors delivering the services (forests, watersheds and water collection and distribution infrastructures at risk of catastrophic fires in this case).Such efforts were pioneered by the Denver Forest to Faucet project in Colorado, or the Santa Fe Municipal Watershed Protection project in New Mexico, among others. In Arizona, with the active contribution of Greenlee County, an effort to create the Arizona Watersheds Investment Fund (AWIF) is underway, and in Flagstaff, Ballot Question #405 received electors' approval in November 2012 for the issuance of a $10 million municipal bond to finance the restoration treatments of high threat areas in the Rio de Flag and Lake Mary watersheds to provide greater protection to the community from the impacts of fires and floods. Therefore, the restoration of forested ecosystems, ponderosa pine and mixed conifer-dominated, in the watersheds of the Mogollon Rim in general, and specifically in the East Clear Creek watershed, is an objective priority, among other areas in eastern Arizona also in need of restoration treatments, for Greenlee County, after the direct protection of communities and infrastructures.	(158-21) Thank you for your comment.
Pearson, Yvonne	Greenlee County's Watershed Restoration Objectives for the upcoming planning cycle include, among others: 1) Prioritize restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures, on the slopes of the Mogollon Rim in general, and specifically in the East Clear Creek, Verde River, Little Colorado River, Upper Gila River, and Upper Salt River watersheds. 2) Develop the Arizona Watersheds Investment Fund (AWl F), and/or similar initiatives in order to fund restoration treatments that cannot be funded by the wood industry utilization of the forest byproducts of restoration in areas where the merchantable material yield is insufficient for mechanical treatments to be economically viable, or access by mechanical harvesting equipment is restricted, such as in	(158-22) Thank you for this information.

Pearson, Yvonne	steep slopes, high erosion areas, riparian areas, etc. 3) Develop in parallel and in a complementary manner all models of watersheds restoration funding such as industry funding, ecosystem services funding, municipal bonds funding, etc. Greenlee County appreciates the addition of grassland restoration treatments to forestland treatments in Alternative C, the Preferred Alternative. The County believes that this addition is significant not only because it implies the restoration of approximately 50,000 acres of rangelands, but because it aptly diversifies the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape restoration.'	(158-23) Thank you for your comment.
Pearson, Yvonne	Greenlee County's Rangelands Resources Objectives for the upcoming planning cycle include, among others: 1) Restore encroached grasslands, including the most departed semi-desert, Great Basin, and montane subalpine grasslands that have been invaded by trees (subalpine grasslands) and shrubs (semi desert and Great Basin grasslands) by removing trees and shrubs where economically feasible, promoting a mixture of native perennial grass species, implementing the periodic prescriptive use of mixed classes of livestock matching animal feeding habits with specific plant material, and reintroducing a regime of cool surface fires in order to reduce trees and shrubs colonization and erosion hazards, and to increase livestock forage production. 2) Adopt management practices that discourage the establishment of nonnative species and eradicate invasive weed species that have little to no forage value, recognizing the fact that the ecological or economic consequences of different exotic species are not all the same, and that the persistence of some nonnative species that are not necessarily undesirable or controllable, such as Kentucky bluegrass or Bermuda grass, may be beneficial from a socioeconomic perspective and a balanced management for multiple resource objectives. 3) Allocate grass reserves on an allotment-by-allotment basis through proper range management, rather than on a district-by-district basis, which requires additional financial considerations for improvement maintenance. 4) Shift the grassland management process from the concept of balancing livestock grazing with available forage - which	(158-24) Thank you for your comment.

Pearson, Yvonne	only addresses stocking rate - toward the concept of managing the intensity, frequency, seasonality, duration and classes of livestock grazing to accomplish the rangelands resources management objectives. 5) Emphasize adaptive management of the rangelands using a three step rangelands resources management monitoring approach of quantitative monitoring using standard measurements such as stocking rate, ground cover, etc.; qualitative monitoring using measurements such as species composition, age, nutritional value, etc.; and, effectiveness monitoring using outcome measurements such as range health, soil water holding capacity, soil organic content, livestock weight gain, wildlife indicator species, etc., in order to measure whether the management actions produce the site specific and cumulative direct and indirect effects desired. 6) Integrate the scientific research and implement the science-based recommendations developed by rangelands resources management experts and scientists. 7) Preserve the contributions of the rangelands resources to the economic development and the custom and culture of the rural Arizona counties Greenlee County would like to preface any subsequent comment by the following four preliminary comments: 1. The quality and thoroughness of the work exhibited by the USFS 4FRI Team in the 4FRI DE IS is outstanding. Greenlee County is fully conscious of the fact that an enormous commitment was made and delivered upon by the USFS 4FRI Team, and that a legitimate pride of ownership must rest with the authors of the DEIS, as well as the Specialists' reports and other documents not published with the 4FRI DEIS but nonetheless part of the 4FRI project record. The County urges the USFS 4FRI Team to consider the County's comments NOT as a critic of their work, but as a goodwill effort toward continuous improvement of the 4FRI EIS, and as a proactive effort by the County to disclose its objectives, plans and policies, and the rationales that support them, to facilitate the statutorily required consistency review, coordination action and conflict reduction regarding potential discrepancies between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and as discussed in this document. 2. Strategically, Greenlee County overwhelmingly supports the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred	(158-25) Thank you for your review and comments. Thank you for recognizing the tremendous collaborative effort that has gone into the analysis, writing, and review creating the 4FRI DEIS. We appreciate your contribution to the further refinement of the DEIS by voicing your concerns and suggestions by way of your comments. Your concerns and suggestions have been noted in the specific responses to the comments which follow.

	Alternative, provided that it is further refined per the following suggestions. Therefore, the following concerns and suggestions are not aimed at questioning the need to implement 4FRI but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process, which could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project as intended by the County. 3. Greenlee County readily acknowledges that several of the following comments and suggestions have already been addressed and agreed upon by the USFS 4FRI Team in the course of the work conducted by the DEIS Review Workgroup of the 4FRI Stakeholders Group with the USFS 4FRI Team. Also, considering the participation of the County in both the 4FRI Stakeholders Group and the DEIS Review Workgroup, there is a high probability that there will be some level of repetition and redundancy between the County's comments and the 4FRI Stakeholders Group comments, as well as comments from other stakeholders. Nonetheless, the NEPA process calls for comments on the DEIS as published, and for the formulation of the County's concerns and suggestions, regardless of whether these are echoed in other comments or not. 4. As previously noted, although Greenlee County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as a body representing the most direct and local expression of democratic government at the individual district or national forest level, Greenlee County more generally defines its role at the policy-making level as it relates to public lands management processes. Greenlee County, therefore, believes that it is appropriate to comment at the programmatic level, from a Forest Service perspective, and at the objectives level, from a County's policy perspective.	
Pearson, Yvonne	For clarification, Greenlee County wants to emphasize that although it generally supports the use of Best Available Scientific Information (BASI) for management decision, it does not support the exclusive use of technical sciences to formulate policies or to make strategic decisions that have an important impact on people. The County believes that these decisions must integrate social sciences in the	(158-26) Thank you for your comment. We used the best available science when developing the purpose and need and analyzing the effects of each alternative. What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the

decision making process. For example, the County believes that while there is no overwhelming supporting science on either side of the long debated issue of a universal diameter cap for restoration treatments (whether it be 9", 12", 16" or 18"). analyzing the issue of a diameter cap from just a technical science perspective is at best incomplete, because the issue of large trees retention is not only a technical issue, but also a social issue that cannot be adequately addressed by an exclusively scientific approach. Therefore, Greenlee County comments will purposefully not emphasize technical issues of silviculture, such as uneven aged composition, regeneration openings, etc., but will be focused on what the County believe to be the crux of the successful and timely implementation of the overriding priority of landscape scale scientifically and socially acceptable - if admittedly imperfect - ecological restoration and catastrophic wildfire prevention. Namely: • Social acceptability of proposed treatments; • Speed of completion of landscape scale restoration; and, • Prioritization of treatments.

project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, scientific uncertainty, and risk. See 40 CFR, 1502.9 (b), 1502.22, 1502.24 (USDA FS 2007). In the DEIS, an alternative was considered but eliminated from detailed study that would have limited mechanical treatments to 8-inch d.b.h. This alternative was based on the assertion that crown fire can be effectively addressed with mechanical treatments that do not cut trees larger than 8 inches d.b.h. Small diameter mechanical tree cutting would be used to establish tree groups, nonforested openings (interspaces), and move toward a balance of tree age and size classes. Prescribed fire would be used to reduce litter and other surface fuels, stimulate herbaceous understory vegetation, prepare sites for natural ponderosa pine regeneration, and maintain interspaces. This alternative would partially address Issue 2, conservation of large trees, since mechanical treatments would be curtailed at 8-inch d.b.h. It would not achieve restoration desired conditions. It would resolve Issue 3, post-treatment canopy cover and landscape openness, since only small-diameter trees would be removed. However, approximately 73 percent of the 507,839 acres of ponderosa pine within the project area would not move toward forest structure and pattern desired conditions. Of all the even-aged stands, 47 percent (VSS 4), 8 percent (VSS 5), and 1 percent (VSS 6) would remain even-aged. There would be zero percent movement toward desired conditions in uneven-aged VSS 4 through VSS 6. For these reasons, this alternative was considered but eliminated from detailed study. The DEIS documents an alternative considered but eliminated from detailed study that would incorporate the 4FRI stakeholder group-created Large Tree Retention Strategy (LTRS, or also referred to as the Old Growth Protection and Large Tree Retention Strategy) as written. A modified version of the original strategy, the Large Tree Implementation Plan, or LTIP, was included in alternatives C and E. Table 15 in the DEIS displays a few excerpts from the original LTRS, the location of the excerpts in the LTRS, a crosswalk to the modified LTIP, and rationale why the original language was not accepted as written. For these reasons it was considered but eliminated from detailed study.

Pearson, Yvonne	Alternative A, the no action alternative, does not offer the option of continuing an existing management approach to landscape scale forested ecosystems restoration in eastern Arizona inasmuch as there is currently no such approach. Alternative A would nonetheless result in the mechanical treatment of approximately 87,000 acres, and in the prescribed fire treatment of approximately 143,000 acres over the next five years (DEIS p. 62). However, the scale and pace of these management actions are incompatible with the urgent need to implement landscape scale restoration as identified in the purpose and needs for the 4FRI NEPA process. Therefore, Greenlee County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative A.	(158-27) Thank you for your comment.
Pearson, Yvonne	Greenlee County understands the NEPA requirement for the 4FRI DEIS to analyze a no action alternative, and the County acknowledges and appreciates the existence of constituencies favoring no. action. However, Greenlee County cannot support an alternative that would result in the continuation of an unmitigated high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Greenlee County is concerned that Alternative A is in direct conflict with the County's objectives as expressed in its plans and policies.	(158-28) Thank you for your comment.
Pearson, Yvonne	Greenlee County regrets to suggest that there is no possible corrective action to mitigate the incompatibility of Alternative A with the County's objectives as expressed in its plans and policies, or to resolve or reduce the conflict between Alternative A and the County's objectives as expressed in its plans and policies. Alternative A 'is so departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Greenlee County's natural resources management objectives, that it does not warrant any further discussion from the County's perspective.	(158-29) Thank you for your comment. We agree that alternative A (no action) would not meet the purpose and need for restoration as defined on pages 8-29 of the DEIS.
Pearson, Yvonne	Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) both generally meet the purpose and needs of landscape scale restoration in' eastern Arizona, as analyzed by the USFS 4FRI Team, and the County. For all practical purposes, Alternative B (the original Proposed Action) and Alternative C (the	(158-30) Thank you for your comments. See the DEIS page 58 to 61 for more information regarding why the original large tree implementation strategy was modified. A modified large tree implementation plan was included in the DEIS in appendix D.

	Preferred Alternative) share many similarities: 1. The acreages treated, both mechanically and by fire-as-a-first-entry (approximately 388,000 acres treated mechanically and 588,000 treated with fire in Alternative B; and, approximately 434,000 acres treated mechanically and 593,000 treated with fire in Alternative C) are very similar; and, 2. The differences in acreage treated mostly result from the addition of grassland treatments to forestland treatments in Alternative C. Nonetheless, there are some differences between Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative): 1. The addition of grassland treatments to forestland treatments in the Preferred Alternative is significant inasmuch as it diversifies aptly the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape' restoration; 2. The increase in mechanical treatments upper limit from 16" to 18" diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) in the Preferred Alternative, while relatively minor from a treatments perspective, is likely to have an impact on the social acceptability of the proposed treatments; 3. The integration of some reworded components of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the Preferred Alternative is likely to have an impact on the social acceptability of the Preferred Alternative; and, 4. The integration of research projects in the Preferred Alternative is a welcome addition. Greenlee County clearly views the addition of grassland treatments to forestland treatments in Alternative C as a positive step toward meeting the County's Rangelands Resources Management Objectives, and generally supports the integration of research projects into restoration implementation projects, wherever and whenever feasible. The County further supports the integration of stakeholders developed strategies and foundational documents such as the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the 4FRI DE IS.	
Pearson, Yvonne	Conversely, Greenlee County is concerned that the adaptation of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) into the USFS 4FRI Team Old Trees	(158-31) Thank you for your comment.

	Implementation Plan (OTIP) and Large Trees Implementation Plan (LTIP) may have an impact on the social acceptability of the Preferred Alternative, as further discussed in the later sections Old Growth and Large Trees. Therefore, Greenlee County generally supports the concepts presented in Alternative C, the Preferred Alternative, provided that it is further refined per the suggestions offered in the County's comments, as well as comments from other stakeholders critical to the viability of the 4FRI social license. However, Greenlee County is concerned that some decisions made by the USFS 4FRI Team may compromise the social license developed for the implementation of the 4FRI project. Consequently, Greenlee County is concerned that the possible social license risk for the 4FRI DE IS potentially caused by some decisions made by the USFS 4FRI Team that may compromise the social license developed for the implementation of the 4FRI project, present a consistency gap between the 4FRI DE IS and the County's objectives as expressed in its plans and policies and in these comments. Greenlee County respectfully suggests that the USFS 4FRI Team and the Responsible Officials exercise careful judgment in their decisions, in relation to: I) the true material importance of the issues, as opposed to their symbolic or emotional importance; and, ii) the potential effect of litigation on the implementation of the 4FRI project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders'	
Pearson, Yvonne	recommendations, and the major benefits attached to sustaining the 4FRI social license.	(158-32) Thank you for your suggestion. The Forest Supervisors will be reviewing all responses to the issues.
Pearson, Yvonne	Alternative D is identical to Alternative B (the Proposed Action) as regards mechanical treatments. It is also identical to Alternative C (the Preferred Alternative) as regards mechanical treatments, except for the minor difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs). The critical difference between Alternative D and Alternatives Band C is the use of fire as a treatment. In alternative D fire would be used on only approximately 179,000 acres, compared to 588,000 acres in Alternative Band 593,000 acres in Alternative C. Greenlee County is concerned that the drastic reduction in the use of fire as a	(158-33) Thank you for your comment. Please note alternative D was developed to respond to concerns people had with prescribed fire emissions. That is why the alternative would reduce the use of prescribed fire by about 69 percent when compared to alternatives B and C. Although the alternatives may appear to be the same (with the exception of the acres of prescribed fire), the effects in terms of creating a resilient forest is very different. In the FEIS, we have clarified the key ecological differences between the alternatives, see table 33 of the FEIS and chapter 3, environmental consequences.

thinning treatment in Alternative D could prevent the timely completion of landscape scale restoration on the Mogollon Rim within the next 20 years as intended with the 4FRI project. The County favors, wherever and whenever possible, prioritizing forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona, with multiple industrial scale new investments. However, the County also recognizes that industry funded mechanical treatments are not appropriate in many sensitive areas such as steep slopes, fragile soils, riparian areas, etc., or in areas where the merchantable yield of restoration treatments would be economically unviable. Further, Greenlee County acknowledges that agency funded mechanical treatments or hand thinning are disproportionately expensive as compared to fire thinning, and the County appreciates that, as discussed in a different context but still related to the implementation of 4FRI treatments in the ApacheSitgreaves National Forests Land Management Plan PDEIS: "the alternatives were realistically designed to reflect anticipated budgets and workforce capabilities," and "none of the alternatives would actually treat enough acres fast enough to fully reach desired conditions within the first 5 decades" (A/S PDEIS p.440). The use of fire as a treatment tool is. therefore, not a luxury from a timeline, economic or practicality perspective, but is instead a necessity. Additionally, the County believes that the ecological role of fire is absolutely critical to the long term ecological sustainability of the forested ecosystems of the Southwest, and that a management alternative that would reduce unduly the use of fire could compromise, in the long term, the implementation of post-treatment maintenance burns. In consequence, Greenlee County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative D. Greenlee County understands the NEPA requirement for the 4FRI DEIS to analyze significantly different alternatives, and the County acknowledges and appreciates the existence of constituencies concerned with prescribed fire emissions, and who favor alternatives

	such as Alternative D. However, Greenlee County cannot support an alternative that could reduce the scope and significantly slow the pace of landscape scale restoration in eastern Arizona, which could result in the unnecessary prolongation of a high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Greenlee County is concerned that Alternative D is not compatible with the County's objectives as expressed in its plans and policies. Greenlee County is concerned that there may not be a corrective action to mitigate the incompatibility of Alternative D with the County's objectives as expressed in its plans and policies. Alternative D is too departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Greenlee County's natural	
Pearson, Yvonne	resources management objectives, to warrant further discussion from the County perspective. Notwithstanding any of the above, Greenlee County is concerned about the three action alternatives and the range of alternatives that they represent. SpeCifically, even though Greenlee County recognizes differences between the three action alternatives as discussed in the previous sections Alternatives Band C and Alternative D, the County is concerned that the mechanical treatments in each of the three action alternatives are similar enough in scale, scope and intensity that the DE IS may not offer an actual range of alternatives when discussing mechanical thinning. Arguably, the difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) is minor, and the addition of grassland treatments in Alternative C or the reduction of fire treatments in Alternative D do not affect forestland mechanical treatments per se. Greenlee County itself is generally satisfied with the mechanical treatments proposed in alternatives B, C and D, provided these treatments are refined to integrate the suggestions of the County and other stakeholders integral to the 4FRI social license. However, the County is concerned	(158-35) Thank you for your recommendation. (158-36) Thank you for your comment. The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act (40 CFR 1501.2(c)) . The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed (36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14). The DEIS (page 62) included 9 alternatives including no action, three
Pearson, Yvonne	that the 4FRI DEIS could be perceived as a DEIS based on a single alternative of mechanical treatments, with nonsignificant variations	

	between the three action alternatives. Therefore, Greenlee County is concerned that the 4FRI DEIS may fail to comply with the Council on Environmental Quality (CEQ) requirements to provide and analyze a range of alternatives (Sec. 1505.1 (e) and Sec. 1502.14 (al) and that the absence of a broader range of analyzed mechanical treatments alternatives may present a process risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DE IS potentially caused by the absence of a broader range of analyzed mechanical treatments alternatives, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study.
Pearson, Yvonne	Greenlee County respectfully suggests that the USFS 4FRI Team request a third party legal review of the NEPA and CEQ requirements in, and of the 4FRI DEIS compliance with, Sec. 1505.1 (e) and Sec. 1502.14 (a).	(158-37) Thank you for your recommendation.
Pearson, Yvonne	The degree of canopy openness in the immediate post-treatment conditions and in the long term desired future conditions has for several years been an issue of debate among the 4FRI stakeholders and the 4FRI collaborative group, including the USFS 4FRI Team, and is likely to remain one. This issue is linked to the discussion of whether vegetative structural stages (VSS) and canopy closure should be measured at group level, as proposed in the 4FRI DEIS, or at stand level, as currently implemented under the Coconino National Forest Plan. Amending the Forest Plan will resolve the technical compliance issue, but it does not address the more fundamental question of whether guidelines originally designed to be implemented at stand or even forest scale (outSide Mexican Spotted Owl protected areas) are directly transferable, or not, to groups within stands. Additionally, the creation of interspaces between groups, in addition to the creation of regeneration openings within groups, will undoubtedly result in a significantly lower canopy density than was deemed desirable in the Management Recommendations for the Northern Goshawk in the Southwestern United States. Clearly, the USFS 4FRI Team has endeavored to be responsive to this concern, as	(158-38) Thank you for your comments. The issue of openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, "Interspace would occupy approximately 25 to 40 percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet." Table 118, on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. The implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example, pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page

evidenced in the 4FRI DE IS Appendix G Bridge Habitat, Appendix D Alternative B through 0 Implementation Plan, and in the silviculture Specialist Report. However, Greenlee County is concerned that the issues raised by partner agencies such as the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department, and by a broad range of stakeholders, have not yet been fully resolved. Questions remain about how and at what scale post-treatment canopy openness will be measured, and how group size, basal area (BA), stand density index (SDI), interspaces, regeneration openings, trees per acre (TPA), and quadratic mean diameter (QMD) interrelate to result in a trajectory toward desired future conditions. As previously noted, Greenlee County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Further, the County readily admits that it lacks the technical competence to contribute meaningfully to the resolution of arcane technical issues such as density management and the relationship between treatment intensity, tree group density, and overall average density, as relates to the implementation of post-treatment openness. Suffice it to say that the very fact that the discussion continues unabated is concern enough to the County that a zone of agreement has not been reached, or that the issues have not been understood clearly and broadly enough for the emergence of a general zone of agreement.

657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the red zone density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a

		preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Pearson, Yvonne	Greenlee County understands that differences of opinions will exist regarding desired canopy openness. What concerns the County is the confusion that exists about questions that should be answered with data, such as: Does science support the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups (within stands)? How does canopy openness measured at group level compare with the reference condition? How and at what scale will post-treatment openness be measured in 4FRI? Does a range of basal area of 50 to 70 in the largest treatment categories provide enough flexibility for a full range of treatments, considering other metrics such as trees per acre (TPA), stand density index (SDI), percentage of interspace, and percentage of openings? How will habitat be provided to closed canopy and high dosed canopy dependent species in the post treatment interim between the thinning of their current habitats and the natural development of high and dense canopy cover in the future old growth?	(158-39) Please see the response to #158-38. Regarding wildlife habitat, we have included a summary of post-treatment openness in chapter 2 of the FEIS (summary of effects table). Post-treatment openness, with a summary of effects, been provided for Mexican spotted owl and goshawk. Also see appendix G of the FEIS.

Pearson, Yvonne	Therefore, Greenlee County is concerned that the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, may be both a process risk and a social license risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk and social license risk for the 4FRI DEIS potentially caused by the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Greenlee County respectfully suggests the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting the science or, if science is lacking, the reasoning backing their decisions to transfer the canopy density guidelines originally designed to be implemented at stand or even forest scale, to groups; 2. Answering specifically the stakeholders' questions regarding the assumptions made in Appendix G Bridge Habitat (for example: percentage of openness at stand level including interspaces and regeneration opening; percentage of existing old growth in old growth allocations; relative higher density of canopy in MSO and goshawk habitats post plan amendments; etc.); 3. Providing qualitative and quantitative 'visual' descriptions of post treatment objectives, including relative proportions and actual sizes of groups, stands, openings, etc., for each treatment type; and, 4. Explaining clearly how openness will be measured post treatments, how it will be monitored, how the monitoring data will trigger adaptive management, and at what thresholds.	(158-40) Thank you for your comment. Please see the response to #158-38.
Pearson, Yvonne	As discussed above, and as analyzed in the 4FRI DEIS, forest plans amendments are technically required for 4FRI to be implemented under the current forest plans of the Coconino and Kaibab national forests. These amendments essentially address management actions (mechanical treatments up to 16" or 18" d.b.h., and low-intensity prescribed fire) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs); and (a) resolve the issues of desired percentage of interspace within uneven-aged stands; (b) add the interspace distance between tree groups; and, (c) add language clarifying where canopy cover is and is not measured to facilitate restoration in goshawk habitat (excluding nest areas). The amendments also	(158-41) Thank you for your comments. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52 (DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In

remove the cultural resource standard that requires achieving a "no effect" determination, and allow for a "no adverse effect" determination. The amendments further remove language referencing monitoring of Mexican Spotted Owl Protected Activity Centers (pre- and post-treatment, population, and habitat), and defer to the U.S. Fish and Wildlife Service the monitoring and design of the treatments in Mexican Spotted Owl protected habitats. Greenlee County understands the technical necessity of amending the forest plans and has no specific issue with the concept. However, the County is concerned about the decision of the USFS 4FRI Team to characterize the amendments as non-significant, and to defer 4FRI projects design and monitoring in Mexican Spotted Owl protected habitat to the U.S. Fish & Wildlife Service, without including the U.S. Fish & Wildlife Service monitoring plan and guidelines for projects design in the 4FRI DEIS. The Forest Service Manual provides guidance in Sec. 1926.52 Changes to the Land Management Plan That are Significant as follows: "2) Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period." In the USFS 4FRI Team's own analysis in Appendix B Forest Plan Amendments: "The canopy cover portion of the amendment would affect 139,308 acres (18 %) of all goshawk habitat on the Coconino NF and about 35 % of goshawk habitat within the project area" (DEIS p. 466); and: "The amendment would affect approximately 20 % of all suitable goshawk habitats on the forest and about 27 % of goshawk habitat within the project area" (DEIS p. 482). It is unclear to Greenlee County if there is. an official percentage threshold for significance in the Forest Service regulations, but it seems that the common understanding of the word 'significant' - "a noticeably or measurably large amount" (Merriam Webster) - would include 35 % of goshawk habitat within the project area in the Coconino National Forest, or 27 % of goshawk habitat within the project area in the Kaibab National Forest. Citing these two percentages as precisely the reason why "For this reason, location and size (were) determined to be non-significant" (DEIS p. 466 and p.482) seems questionable, unless guided by an agency guideline, in which case a reference would be useful. Additionally, it

alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51). With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into

is unclear how the canopy cover portion of the amendments would affect only 35 % and 27 % of goshawk habitat respectively, although the County speculates that it is related to higher vegetative structural classes (VSS). Further, Greenlee County is generally comfortable that habitat restoration and reduction of fire risk are key to improving Mexican Spotted Owl (MSO) habitat quality and, therefore, are aligned with both the current Coconino and Kaibab forest plans, as amended, and the U.S. Fish and Wildlife Service's (USFWS) revised MSO recovery plan (2012). However, the County is concerned that deference of treatments design to another agency (USFWS) without integrating this agency's proposed treatments, or at least guidelines, in the 4FRI DEIS makes it impossible for the 4FRI DEIS Team to analyze the site specific and the cumulative effects of the treatments. Therefore, Greenlee County is concerned that the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the inclusion of a USWFS monitoring plan or treatments guidelines, and without the possibility to analyze their effects in the 4FRI DEIS, may present a process risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DE IS potentially caused by the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the possibility to analyze their effects in 4FRI, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C) Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would

		impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS).
Pearson, Yvonne	Greenlee County respectfully suggests that the USFS 4FRI Team request a third party legal review of the Forest Service Manual requirements in, and of the 4FRI DE IS compliance with, Sec. 1926.52 as relates to a determination of non-significance. Greenlee County further respectfully suggests that U.S. Fish and Wildlife Service monitoring plan and guidelines for the design of treatments in Mexican Spotted Owl protected habitats be incorporated into the 4FRI DEIS, and that their expected direct and indirect site specific effects be analyzed, presented, and integrated into the cumulative effects analysis.	(158-42) Thank you for your recommendation. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane.
Pearson,	The adaptation of the stakeholders-developed single document Old	(158-43) Thank you for your comments. The DEIS included specific

Yvonne

Growth Protection and Large Trees Retention Strategy (OGPLTRS) by the USFS 4FRI Team resulted in two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Lorge Trees Implementation Plan (LTIP). The Large Trees Implementation Plan (LTIP) is discussed in the following section Large Trees. Clearly, the focus of the 4FRI stakeholders on old growth protection has been integrated by the USFS 4FRI Team in the 4FRI DE IS. Section C Old Trees Implementation Plan of Appendix D Alternative B through D Implementation Plan captures the essence of the stakeholders' old growth protection strategy: "Old trees would not be cut for forest health issues or to balance age or size class distributions" (DEIS p. 644). Greenlee County also observes that, as required in order to comply with the forest plans, old growth allocation in the 4FRI DE IS meets the 20% minimum requirement for vegetative structural stage (VSS) 6 Old Forest; and Appendix D Section B Decision Matrix for establishing tree groups, interspace, and regeneration openings, preserves trees with old tree characteristics. However, Greenlee County observes that, past the affirmative statements in the 4FRI DEIS, the actual field decisions are left open to individual judgment. While "human health and safety" (DEIS p. 644) should be a fairly objective criteria, "additional habitat degradation" may be more open to interpretation, as illustrated in Section C Old Trees Implementation Plan itself where the example of prevention of additional habitat degradation involves ... road construction! Further, Greenlee County also observes that the 4FRI DE IS states that "most sites (allocated to old growth) currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans" (p. 15). Considering that the purpose of allocating acres to old growth forest is to manage these acres for the fastest possible growth of existing trees toward VSS 6, there is a high likelihood that mature large trees in VSS 5 may be thinned in order to reduce competition for VSS 6 candidates. This decision also involves personal interpretation and individual judgment calls which may prove socially acceptable or disastrous based on the individual making the decision. Therefore, Greenlee County is generally satisfied with the Old Trees Implementation Plan (OTIP) and old growth management objectives stated in the 4FRI DE IS, but remains

treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention" (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range." The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller

	concerned that its implementation may be a social license risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by a misguided implementation of the Old Trees Implementation Plan (OTIP), may present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Pearson, Yvonne	Greenlee County respectfully suggests that the USFS 4FRI Team include strict and restrictive guidance regarding the possible removal of old growth, including a maximum number of trees removed according to appropriate metrics such as possibly: per 10 acre block, per mile, per project, or similar. Large trees are particularly precious inasmuch as they represent the 'future old growth' necessary to restore the forests of eastern Arizona to an ecologically sustainable condition, and to provide habitat to dense and high canopy dependent species. The old growth 'allocation' requirement of 20% in the forest plan, as discussed in the previous section Old Growth, is a 'paper' allocation and should not be confused with the 'actual' old growth that exists in the lower single digit percentage across the forests, numerically far below the required 20% - or even 10% - and temporally far removed from reaching the required 20%. The deficit of actual vegetative structural stage (VSS) 6 Old Forest is what makes vegetative structural stage (VSS) 4 and 5 Mid-age Forest and Mature Forest important. This reasoning guided Greenlee County when it participated to the stakeholders development of the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) that the USFS 4FRI Team adapted into two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (lTIP). The Old Trees Implementation Plan (LTIP) is discussed in the previous section Old Growth. The purpose of the stakeholders' large trees retention strategy is to emphasize the retention of large trees (VSS 4 and 5) in order to re-establish the old growth necessary for the ecological	(158-44) Thank you for your suggestion. However, the intent of the project is to retain all pre-settlement trees unless there are public health and safety issues. See response to comment 76-47. (158-45) The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape." Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the
Pearson, Yvonne		

sustainability of eastern Arizona forests. However, the large trees retention strategy also includes a series of exception mechanisms that codify the socially acceptable removal of large trees (VSS 4 and 5) with a diameter superior to 16" at breast height (d.b.h.), when their removal is necessary to achieve the ecological restoration objective, to increase heterogeneity, and/or to conserve biodiversity. The stakeholders' document also includes provisions for collaborative adaptive management and collaborative participation to propose decision content. While complying with the statutory retention of the decision making authority by the Responsible Official. Greenlee County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) i) does not fully reflect the intent of the stakeholders; and, ii) does not take advantage of the products of the 4FRI collaboration. Specifically: 1. The Forest Service determined that: "The original LTRS did not provide the ability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings category" (DEIS p. 57). In so stating, the Forest Service apparently overlooks the fact that removal of individual large young trees is allowed under the exception mechanism, as required to meet the ecological restoration objective. The stakeholders' intent in constraining the removal of groups of large young trees is to allow the development of future old growth as required in the forest plans, including old growth groups. 2. The Forest Service further determined that: "this would result in a continued imbalance of size classes that would be contrary to the forest plan desired conditions" (DEIS p. 57). In so stating, the Forest Service fails to capitalize on the fact that the 4FRI DEIS already includes several forest plans amendments and that these amendments can address this issue as well. Further, the USFS 4FRI Team does not disclose at what scale the imbalance would occur. Imbalance at group level, or even possibly at stand level, becomes balance at larger scales as groups of VSS 5 future old growth balance large areas devoid of them. 3. The Forest Service also determined that: "The original LTRS would have required the Forest Service to consult with stakeholders should a new exception category be found during implementation (LTRS, page 25).

landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component"□. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. See our previous response regarding the large tree retention strategy and alternatives considered but eliminated that addressed diameter limitations as a means to conserve large trees.

Pearson, Yvonne	To resolve the potential for Federal Advisory Committee Act (FACA) violations, this consultation requirement was removed" (DEIS p. 57). In so stating, the Forest Service misses an opportunity to take. advantage of the MOU signed between the USFS and the stakeholders to address specifically such issues through collaboration in compliance with FACA. Therefore, Greenlee County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) is likely to be a significant social license risk for the 4FRI DEIS, and that the risk / benefits analysis of the social license risk vs. the restoration benefits may be unfavorable to 4FRI. Consequently, Greenlee County is concerned that the social license risk for the 4FRI DEIS likely caused by the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP), presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Greenlee County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2. Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during implementation; and, 3. Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale analysis not address the issue of continued imbalance of size classes.	(158-46) See previous responses.
Pearson, Yvonne	Greenlee County observes that there are only a mere 5 instances of the word "prioritization" in the 744 page 4FRI DEIS. The County further observes that none of these instances apply to the discussion of the concept of treatments prioritization, for the obvious reason that there is no discussion of treatments prioritization in the 4FRI DEIS, including in Appendix 0 Alternative B through D Implementation Plan, or in the specialist reports or in the project	(158-47) See previous responses. We recommend the counties continue to work with the forests and the monitoring and adaptive management group during implementation.

record. Greenlee County also observes that Appendix 0 Alternative B through D Implementation Plan contains no discussion of timing or sequencing of treatments and that the concept of 'Implementation Plan' seems interpreted in the 4FRI DEIS as 'guidelines to implement' rather than 'action plan to implement' or 'work plan to implement.' The County certainly realizes that minute details of implementation are not a NEPA concern but a contracting management concern. However, the County also posits that the implementation of a management action as far reaching in scope and temporal and geographical scale as 4FRI, requires a discussion of timing and sequencing, inasmuch as timing and sequencing of treatments are of a nature to potentially impact significantly the site specific effects of individual treatments and the collective cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects). Further, the concept of 'Strategic Placement' of the treatments, in relation to values to be protected, dominant winds, modeled fire behaviors, etc., is critical in the determination of what treatments are most appropriate, how many treatments are required, what treatment intensities are required, and what is the best distribution between treatment types (mechanical vs. fire). The 4FRI stakeholders worked extensively to produce the Landscape Restoration Strategy for the First Analysis Area (2010) that addressed in detail the concept of geographical and temporal prioritization. This work was further refined with the participation of the USFS 4FRI Team into a classification of High Resource Values (HRVs) and Medium Resource Values (MRVs). Some elements of this work were utilized by the USFS 4FRI Team in the 4FRI analysis process, but the discussion of strategic placement; geographical and temporal prioritization; and, their impact on: number, type, intensity, individual and cumulated effects of treatments, is missing. Greenlee County is not inferring the need to re-analyze the location of the treatments. The County is generally satisfied with the map of treatments location. However, because the timely implementation of the restoration treatments is critical to meeting the purpose and needs of the proposed action, the County is concerned that the spatial and temporal sequencing of the

	treatments may have a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Therefore, the absence in the 4FRI DEIS of spatial and temporal strategic timing and sequencing of the treatments,and integration of the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI EIS. Consequently·, Greenlee County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a discussion of strategic placement, spatial and temporal prioritization, and their influence on the number, type, intensity, and individual and cumulated effects of treatments, presents a consistency gap between the 4FRI DE IS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Greenlee County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1. Presenting a temporal prioritization of the treatments and a sequenced timeline of implementation for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; 2. Presenting a spatial prioritization of the treatments and the sequenced locations of the treatments, for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; and, 3. Presenting how the temporal and spatial prioritization affect the number of treatments, type of treatments, intensity of treatments, direct, indirect, site specific, and cumulated effects of the treatments.	
Pearson, Yvonne	Fire behavior modeling is a critical part of the 4FRI site specific and cumulative analysis process, and Greenlee County appreciates the fact that a major effort was made along the entire 4FRI analysis process, starting well before the DEIS, or even the Proposed Action, to model the cumulative effects of landscape scale restoration treatments on fire behavior. To the County, post-treatments and long term future desired conditions fire behaviors represent much of the 'end game' in 4FRI, as the restoration of a natural regime of regular cool surface fires is fundamental to the long term ecological sustainability of the forests of eastern Arizona. Probably as a consequence of the fact that the 4FRI DEIS does not include a specific	(158-48) Page 15 to page 25 of the fire ecology report prepared for the DEIS outlines methodology and modeling used to support the fire analysis. For example, the fire report states, “Fire behavior for existing conditions was modeled for the project area using default Landfire Refresh 08 data. Results were reviewed by local fire experts (district, forest, National Park Service and non-federal firefighters and managers), and adjustments made to improve model accuracy. The process was repeated to further improve results. Fire behavior for post-treatment conditions was modeled using FlamMap and a combination of Landfire Refresh 2008 data and FVS-FFE data (LANDFIRE 2010a, LANDFIRE2010b). Post-treatment canopy characteristics and fuel

treatments implementation plan including timing, prioritization and sequencing of treatments in Appendix D Alternative 8 through D Implementation Plan (see section Prioritization here above), the fire behavior modeling in the 4FRI DEIS only provides a theoretical modeling based on the unrealistic premise that all treatments would happen simultaneously. This is unfortunate because the fire behavior modeling cannot include accurate canopy characteristics (base height, bulk density and cover) or surface fuel loading for any given large area at any given point in time as a result of some treatments being implemented; some treatments not being implemented yet, with fuel load further increasing and canopy characteristics further degrading; and, some treatments having been implemented, possibly as earlier as a decade earlier, with canopy and fuel loading characteristics at various stages of regrowth. Accordingly, Greenlee County is concerned that post-treatment fire behavior as modeled may not represent reality, and that the analysis of the cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects) may be tainted. Therefore, Greenlee County is concerned that the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, due to the lack of timing and sequencing of the treatments, may present a process risk for the 4FRI DE IS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Suggested action Greenlee County respectfully suggests that subsequent to the completion of an analysis presenting a temporal and spatial prioritization of the treatments, the USFS 4FRI Team provide a clear and compelling analysis of the effects of the treatments on fire behavior, presenting annual or bi-annual fire behavior modeling based on the outcome of the progressive implementation of 30,000 acres of restoration treatments annually

loading were determined using the Fire and Fuels Extension (FFE) (Reinhardt and Crookston 2003) to the Forest Vegetation Simulator, FVS (Dixon 2002). In fire modeling, outputs (such as fire type and fireline intensity) are determined, in part, by the fuel models used. Post treatment fuel models need to take into account changes in total fuel loading and fuel structure. Landfire data must be manipulated to produce post-treatment conditions for fire modeling, so outputs from FFE were used to develop post-treatment fuel models. The modeled post-treatment fire behavior data are the result of combined stand data from the Forest Vegetation Simulator (FVS) and Landfire Refresh 2008 data. Post-treatment fire type was modeled by using outputs from FVS-FFE to adjust the percent of change to canopy characteristics and surface fuel loading and to inform the assignation of post-treatment fuel models. Details of the process for assigning post-treatment fuel models for modeling fire type is included in Appendix D. FVS outputs used were stand averages that were used to give a general idea of what stand conditions would look like, but could not address the spatial distribution of specific metrics on the same scale as the Landfire data. Landfire/FlamMap data are gridded (raster) data, with a resolution of 30 meters. FVS/FFE data is vector based, with smallest units being the size of individual stands. The 'hills and valleys' of the stand characteristics were smoothed out when the stand data were averaged, resulting in the fire behavior also being 'smoothed out' somewhat. A stand is 'typed' as a single vegetation type, though it may have a mix, for example, of pine forest and grassy openings. Habitat types (e.g. core areas, restricted habitat, etc.) were classified at the stand level to facilitate silvicultural analysis. Fire behavior was modeled at the 30 meter scale. The resolution for modeled fire behavior is 30 meters". The cumulative effects analysis for all alternatives is located on pages 227 to 249. Pages 18-23 of the fire ecology report specifically discusses methodology for evaluating canopy characteristics and fuel loading. Pages 23 to 25 display data sources and models. Appendix D of the fire ecology report (pp. 283-321) is titled, "Descriptions of models and processes used in fire modeling". Appendix D not only includes information on how the model was used but also discusses limitations associated with specific models.

	over the 10 year life of the 4FRI project, and that the impact of this analysis be integrated in the analysis of the number, type and intensity of treatments required to meet the purpose and needs, and the direct, indirect, site specific, and cumulated effects of the treatments. The ponderosa pine vegetation type in the 4FRI DE IS analysis area is dominated by Class 2 functional at-risk 6th level Hydrologic Unit Code (HUC) watersheds on about 451,500 acres or 46 % of the analysis area. Class 3 impaired watersheds represent about 316,800 acres, or about 32 % of the analysis area. Class 1 properly functioning watersheds represent about 220,400 acres, or about 22 % of the analysis area (DE IS p. 107). Per the Specialist report, and as summarized in the 4FRI DEIS, the 4FRI restoration treatments under Alternative B (the Proposed Action) and Alternative C (the Preferred Alternative) are expected to result in an improvement in 23% of Class 2 functioning at-risk watersheds (-104,000 acres), and 42% of Class 3 impaired watersheds (-133,000 acres), with 28 miles of improved water flow regimes overall, including 19 miles in Class 2 watersheds that are functioning at risk and 9 miles in Class 3 watersheds currently impaired (DEIS p. 114). Greenlee County is generally satisfied that the effects of the 4FRI restoration treatments under Alternative B and Alternative C contribute significantly toward the	
Pearson, Yvonne	County's objectives as expressed in its plans and policies and in these comments. Greenlee County encourages the USFS 4FRI Team to prioritize wherever and whenever possible restoration and catastrophic fire	(158-49) Thank you for your comment.
Pearson, Yvonne	prevention treatments in the watersheds, after the direct protection of communities and infrastructures. During the participation of the Eastern Arizona Counties Organization in the DE IS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Greenlee County observed that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Additionally, the site specificity verification process revealed that	(158-59) See our previous response. Treatment in at-risk watersheds is a high priority. (158-51) During this process (from scoping to DEIS to FEIS), no one has asked for the complete project record, including ECO. Throughout this entire process, we have openly shared our GIS data. It appears to have been usable to those with geospatial technology skills for a particular resource such as wildlife, silviculture and fire. We believe the project record, including all supporting data, has been included. We would
Pearson, Yvonne	some of the required Geographic Information System (GIS) data tables or layers were not entered into the official project record.	welcome you pointing out to us what supporting data or information is missing in our project record.

Therefore, Greenlee County is concerned that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data and may present a process risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Greenlee County respectfully suggests that the USFS 4FRI Team conduct a systemic and systematic review of all technical data, GIS or other, used in their analysis, and ensures that it is included in the 4FRI project record. The County further suggests that the USFS 4FRI Team use the same methodology of random sampling as used by the DEIS Review Workgroup of the 4FRI Stakeholders Group to statistically verify that all required data is included in the project record.

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During the participation of the Eastern Arizona Counties Organization in the DE IS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Greenlee County verified to its satisfaction that the required site specificity as regards current condition, desired future condition, prescribed treatment, and site specific effects has been provided in the USFS 4FRI Team analysis process. However, as stated in the above section Continuity between the USFS 4FR/ Team work, the 4FR/ project record, and the 4FR/ DE/S, the site specificity verification process with the USFS 4FRI Team evidenced to both the County and the USFS 4FRI Team that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Therefore, Greenlee County is concerned that the difficulty to access site specificity information may present a process risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DE IS potentially caused by the difficulty to access site specificity information, presents a consistency gap

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(158-52) See our response to comment #158-51.

(158-53) Regarding site specificity, the DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000 different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery

between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions" (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601). The site-specificity of the analysis was tested by the 4FRI stakeholder group. In response to comments on

		the DEIS, the stakeholder's wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue (4FRI Stakeholder, 2013 Cara Letter #155). See our previous responses which address the inclusiveness of project record documentation.
Pearson, Yvonne	As discussed by the Eastern Arizona Counties Organization with the USFS 4FRI Team, Greenlee County respectfully suggests that the interactive map presented on the 4FRI DEIS website be developed to allow easy 'point and click' access to site specific information such as, but not limited to, current condition, desired future condition, prescribed treatment, site specific direct and indirect effects, and contribution to cumulative effects, as well as all the technical information regarding all relevant resources as can be conveniently provided. Alternatively, if technical or resource constraints preclude the USFS 4FRI Team to develop the above suggested interactive map, or to make it available to the public, Greenlee County respectfully suggests that a 'point and click' function could provide information on how to procure the desired site specific data from the project record.	(158-54) The interactive map is designed to provide people with an alternative method of reviewing maps and alternatives than the traditional poster-sized hard copy. People may still review the project record index and request documents (if not considered to be sensitive information, such has heritage site locations).
Pearson, Yvonne	Appendix F Cumulative Effects includes a comprehensive list of the past, current and reasonably foreseeable future projects and disturbances included in the cumulative analysis. These projects and disturbances include vegetation projects (mechanical thinning and prescribed fires); recreation projects; other projects; wildfires; insect and disease outbreaks; and, a short discussion of reasonably foreseeable projects with insufficient information for analysis. The list includes projects located on private, State, national forests and other federally managed lands that lie within, adjacent to and	(158-55) In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current

outside of the project area. Appendix F Cumulative Effects does not include a discussion of what the cumulative effects of all the projects are, and only includes a brief synopsis of Authorized Livestock Management; Timber Harvest; and, Past-1996 Vegetation Treatments - Uneven-aged Management, Fire Risk, Restoration, summarized from the Specialists' reports.

condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. In the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and ongoing projects by the FS and identified each project by National Forest and Ranger District. Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 - 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 - 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 - 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321).The above actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects analysis for MSO was revised. The FEIS wildlife report states "Because of the size of the 4FRI analysis area and the large portion of the western

Pearson, Yvonne	Chapter 3 Affected Environment and Environmental Consequences addresses extensively the concept of cumulative effects on Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive	UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects" (Wildlife Report, page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers. comm. 2006). Wildlife habitat in the form of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, table, 153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page 400 to page 412 of the wildlife report. Similar to MSO, the goshawk cumulative effects analysis has been revised since the DEIS was published, see the FEIS, chapter 3. (158-56) Thank you for your comment. For past actions, the cumulative effects analysis must be consistent with 36 CFR 220.4(f). This regulation incorporates direction from 40 CFR 1508.7 and The Council on Environmental Quality Guidance Memorandum on Consideration of

	Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; and, Transportation. However, the format used to discuss the cumulative effects varies considerably from resource to resource. For example, the Soils and Watershed (DEIS p.lOS-121) and the Terrestrial and Semiaquatic Wildlife and Plants (DEIS p.173-24S) sections include fairly comprehensive descriptions of the cumulative effects and of their rationale. Other sections formulate cumulative effects as opinions, or as summary statements that essentially posit that the past or current projects have achieved or are achieving their stated objectives.	Past Actions in Cumulative Effects Analysis (June 24, 2005). FSH 1909.15.3 provides specific direction on determining the spatial and temporal boundaries, two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial boundaries define the affected area for each resource indicator. Affected areas can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. “For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political" (FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose. Regarding the content of the cumulative effects analysis, please see our response to comment 76-62.
Pearson, Yvonne	he Cumulative Effects section itself of Chapter 3 is but a two sentence paragraph that states: "A summary of past, present, and reasonably foreseeable management actions and natural disturbances that were evaluated by most resources is located in appendix F. See the project record for the comprehensive master list of all projects and for additional information on each project" (DEIS p. 331). Greenlee County is generally satisfied that the list of projects considered in the cumulative effect analysis is appropriate, with one notable exception. Since the completion of the 4FRI DEIS, the Flagstaff Watershed Protection Project Proposed Action (PA) has been released (April 2013) and will need to be integrated into the cumulative analysis in the final EIS. Greenlee County is generally satisfied that the resource specialists have conducted some form of cumulative effects analysis, and the County realizes that the cumulative effect analysis methodology cannot be identical across resources. However, the County is concerned that the methodologies for cumulative effects analysis are generally not satisfactorily explained, and may be inconsistent in depth and breadth across	(158-57) Chapter 2 of the FEIS notes that 4FRI treatment acres overlapping with the Flagstaff Watershed Protection Project have been removed from the 4FRI FEIS analysis. See our response to comment 76-62 and 76-63 for a general discussion on cumulative effects.

	resources. The County is further concerned that the issue of continuity between the project record, the specialists reports, and the DEIS - already identified regarding site specific effects - may also exist regarding cumulative effects. Therefore, Greenlee County is concerned that potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis may present a process risk for the 4FRI DE IS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DE IS potentially caused by potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	
Pearson, Yvonne	Greenlee County respectfully suggests that the USFS 4FRI Team include the Flagstaff Watershed Protection Project Proposed Action (April 2013) in the cumulative analysis in the final EIS. Greenlee County further respectfully suggests that each resource section of Chapter 3 Affected Environment ond Environmentol Consequences include a methodology subsection describing the methodology used for cumulative effects analysis. The County also suggests that the USFS 4FRI Team review methodologies across resources to ensure consistency of depth and breadth of cumulative effects analysis.	(158-58) Please see the response to #158-57.
Pearson, Yvonne	Appendix E Alternative B through D Monitoring and Adaptive Monogement Plan offers brief one or two sentence descriptions of: types of monitoring (ecological, implementation, effectiveness, validation and Collaborative Forest Landscape Restoration Act (CFLRA)); monitoring prioritization, scales, question and indicators; and, a ten line description of adaptive management. Appendix E also includes Table 143 Implementotion monitoring questions, indicators, frequency of meosurement, data source, ond cost; Table 144 Landscope-scale effectiveness desired conditions, indicators, frequency of measurement, data source, and cost; and, Table 145 Effectiveness monitoring plan. However, Greenlee County observes that about half of Table 143 Implementation Monitoring is left blank, and for most questions for which the table is not blank, the indicators are crude and the frequency is minimal (typically: annual	(158-59) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that

acres and miles). Table 143 looks more like an annual budgetary reporting table than a project implementation monitoring plan. The quantitative aspect of implementation monitoring seems addressed but the qualitative aspect of implementation monitoring seems largely unaddressed or unanswered. It is surprising that half the table is incomplete, indicating an unfinished product.

results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. County comments imply the need for a supplemental EIS because the monitoring plan was not complete. In response to comments on the DEIS an agency may: (1) Modify alternatives including the proposed action, (2) Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan. As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the Adaptive Management section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in how the plan questions and indicators are organized and change section name to "Monitoring: Desired Conditions, Indicators, Thresholds and Triggers", (6) Modified the "Monitoring Prioritization" section to

		reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and changed section name to "Prioritization - Monitoring Tiers"; and (7) Modified the "Monitoring Scale" section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix B) informed people that the monitoring plan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species" section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation" section) and the development of the implementation plan (appendix D).
Pearson, Yvonne	Greenlee County also observes that Table 142 Monitoring scales, is left incomplete inasmuch as it does not include any monitoring scale below the sub-unit for the 4FRI DE IS. This, too, indicates an unfinished product. Further, there appears to be a gap in the effectiveness monitoring plan inasmuch as most of the treatments focus on achieving treatments objectives and desired conditions at the stand or even group level, while most of the effectiveness monitoring appears to be planned at the landscape scale. Greenlee County further observes that Table 144 Landscape-scale Effectiveness offers a fairly comprehensive list of desired future conditions: Conservation of Biological Diversity; Ecosystem Resilience; Water and Air Resources; Economics; Social Systems; and, Heritage Resources. However, the indicators listed are macro level indicators and the frequency of measurement is generally annually or every 5 years, and many sections of the table in the "Data Source/Spatial Scale/Cost" column indicate "No numbers provided." This further indicates an unfinished product. Greenlee County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more of an adaptive management decision matrix than an effectiveness monitoring plan. Adaptive management is addressed in the following section Adaptive Management.	(158-60) Thank you for your comment. Please see our response to #158-59 which provides a summary of all updates to the plan between DEIS and FEIS.
Pearson,	Greenlee County is concerned that the 4FRI DEIS, the Specialists	(158-61) Thank you for your comment. A project work plan is developed

Yvonne	reports and the project record do not include a specific 'action plan' or 'work plan' and budget, or funding mechanisms, for the monitoring plan. Although the question of who will monitor, and potential funding sources, are nominally mentioned in Table 141 Monitoring plan tiers, the scale, scope and complexity of 4FRI require addressing these questions in a comprehensive fashion that goes well beyond a passing mention in Table 141. How many man-hours will the implementation of the monitoring plan require? Who will provide these man-hours? How much will it cost? How will it be funded? What are the quality control mechanisms to ensure that monitoring itself - if provided by volunteer (amateur?) third parties - meets required criteria? What mechanisms exist to ensure the integrity of the measures? Further, the reliance on "stakeholders" and "multiparty (monitoring boards)" in the 4FRI DEIS monitoring plan tiers (Table 141, DEIS p. 660) raises questions which are left unanswered regarding the functioning of the monitoring plan. For example: What is the USFS mechanism to utilize third party developed monitoring data to make agency action adaptive management decisions? What are the mechanisms to deal with adaptive management decisions that may be of a nature to significantly alter the management actions identified in the Record of Decision? Etc.	each year once the Agency receives its budget as appropriated by Congress. Once the annual budget is available, the Forest Service will work with the Multi-Party Monitoring Board to prioritize monitoring activities. All of these questions will be answered in collaboration with the Multi-Party Monitoring Board as set forth in the collaboratively developed AMMP. These determinations cannot be made until we know more about the available annual budget, the funds that can be leveraged by partners, and the specific monitoring protocols developed by the Forest Service and the monitoring board. The Forest Service will continue to consider new peer-reviewed science as it becomes available. The collection of monitoring data through a third party would be coordinated by the multi-party monitoring board in collaboration with the Forest Service. Once the data is delivered, it will be verified and evaluated through by an interdisciplinary team of resource specialists. The results of the evaluation and the implications of potential adaptive management actions will be provided to the deciding official for a final decision. If monitoring indicates that the environmental effects of each action do not exceed the bounds of those disclosed in the environmental document, and the actions serve to move the project towards the desired conditions, the Forest service can continue implementation as described without the need for new or supplemental NEPA review (FSH 1909.15, 54.1). However, if monitoring indicates that the project is not moving towards the desired condition, the Forest Service will first evaluate design adjustments within the bounds of the management actions already disclosed and analyzed in the environmental document. For example, if the Forest Service were modifying the vegetation within an area according to treatment type UEA25, we may reduce the area occupied by interspace to 25 percent; rather than the maximum allowable of 40 percent. In both cases, the treatment type is the same, but the design change may better move the projects towards the desired condition. "In the case that new information or changed circumstances result in environmental impacts of a proposed action not disclosed or analyzed, further interdisciplinary review should occur as described in section 18"□ (FSH 1909.15, 54.1). (160-62) Thank you for your comments; they have been noted. See previous responses on budget and responses on the completeness of the information provided to the public in the DEIS on monitoring. The
Pearson, Yvonne	Greenlee County is further concerned that the ability of the public to review and comment on the 4FRI monitoring 'action plan' or 'work plan' and budget has been compromised inasmuch as even if the	

	USFS 4FRI Team develops such a plan and budget as an outcome of the comments process, the plan will not be available for public review and comments until a notice of decision is published, unless the USFS 4FRI Team decides to release a second 4FRI Draft EIS (DE IS) or a Supplemental EIS (SEIS). Considering that the 4FRI monitoring 'action plan' or 'work plan' and budget currently do not exist, it is not possible to submit substantive comments on them and, therefore, a potential objection could be ineligible based on 51.52- Issues Not Based on Previously Submitted Substantive Formal Comments.	monitoring and adaptive management plan was developed in collaboration with stakeholders. Enough information was provided in the DEIS (DEIS Appendix E) to inform the public. Sufficient information was included because many comments were received on the plan, including the need to incorporate the MSO monitoring plan. That document was unavailable at the time the DEIS was released for public comment because it was derived from the FWS biological opinion. However, 36 CFR 218.8 does address new information that was provided to the public after a comment period has been provided, "(c) Issues raised in objections must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector, unless the issue is based on new information that arose after the opportunities for comment". While there have been updates to the analysis since the DEIS was made available for public comment, the changes from DEIS to FEIS are insignificant or in response to public comments on the DEIS (allowed by CEQ). There is no need for a supplemental DEIS.
Pearson, Yvonne	In contrast, the current Forest Service Manual requirements for Plan Monitoring Program Design (Sec. 1921.51) are extremely specific: "In designing the plan monitoring program, the Responsible Official: 1. Should consider ongoing project and activity monitoring. 2. Should establish and apply a screening process (FSH 1909.12, section 12.1) to ensure that only feasible and meaningful monitoring activities are conducted, and in a manner that is practical and affordable. 3. Should store and manage monitoring data in corporate applications such as Natural Resource Information System whenever the capability exists. 4. Should develop a multi-year monitoring guide that describes protocols, databases, and a monitoring schedule. 5. Shall develop an annual monitoring action or work plan to identify the specific monitoring tasks to be accomplished and the budget and personnel associated with those tasks." Greenlee County fully understands that Sec. 1921.51 was initially written to apply at Forest Plan level, and that the 4FRI DEIS is nested at project level within the Coconino and Kaibab forest plans. However, CEQ has made very clear that when mitigation is involved in the NEPA analysis - such as the adaptive management mechanism integrated within the 4FRI DEIS - monitoring is automatically invoked. Therefore, Greenlee County is	(158-63) As you state, the Plan Monitoring Program Design referenced in this comment applies to Land Management Planning (i.e. Forest Plans) and not to project monitoring. Furthermore, "CEQ recognizes that it may not be possible to identify fund from future budgets; however, a commitment to seek funding is considered essential and if it is reasonably foreseeable that fund for implementation of mitigations may be unavailable at any time during the life of the project, the agency should disclose in the EA or EIS the possible lack of funding and assess the resultant environmental effects"□ (CEQ memorandum 2011). The Forest Service commits to using a portion of its annual funding for monitoring and both the Forest Service and the 4FRI stakeholder groups have committed to seeking additional funds. The updated AMMP clearly states that "budget limitations dictate how much and what type of monitoring can be accomplished. In order to prioritize what monitoring will be accomplished, this plan provides a tiered system for prioritizing monitoring" (DEIS Appendix E). CEQ guidance also provides that "agencies have discretion, within the scope of their authority, to select an appropriate form and method for monitoring" and "possible monitoring methods include agency-specific environmental monitoring, compliance assessment, auditing systems" (CEQ memorandum 2011).

concerned that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular; that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised; and, therefore, the 4FRI Monitoring Plan may present a process risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular, and that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Monitoring 'action plan' or 'work plan' Greenlee County respectfully suggests that the USFS 4FRI Team include in very specific terms: i) quantitative, qualitative and effectiveness monitoring processes; ii) a monitoring 'action plan' or 'work plan' and budget; and, iii) the resources allocation and funding necessary to implement monitoring in the 4FRI DEIS, to ensure that the monitoring of the 4FRI project implementation is quantifiably and qualitatively implemented. Practically, Greenlee County suggests a three step monitoring process articulated as follows:1) Quantitative implementation compliance monitoring. The purpose of the quantitative implementation compliance monitoring is to answer the question: "Was the job done?" While, generally, this assessment is made by the Forest Service contract management team when a contractor is involved, it is suggested that this step becomes the beginning of the process rather than what is often the end of it. Specific quantitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must

Pearson, Yvonne

The AMMP was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Interested parties may scrutinize the updated monitoring plan and continue to comment. This may occur during the objection period which is designed to allow discussions between the FS and interested parties to explore any changes to the proposed actions. This discussion occurs before the Record of Decision is signed that authorizes project implementation. (158-64) The DEIS identifies design features and mitigation by resource that would apply to any of the action alternatives (DEIS, Appendix C, Table 111, page 565 to page 599). Appendix D of the DEIS states, "This implementation plan is designed to be integral to the selected alternative and record of decision (ROD). The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Table 112 to table 115 is checklists designed to monitor compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that

include, disclose and commit the Responsible Officials to provide the resources and budget required. 2) Qualitative implementation compliance monitoring. The purpose of the qualitative implementation compliance monitoring is to answer the question: "Was the job done correctly?" The need for qualitative implementation monitoring increases rapidly with the complexity of the actions undertaken. Complex forest restoration prescriptions implemented using designation by description (DxD) or designation by prescription (DxP) create substantial room for interpretation by the operators, and may result in outcomes substantially different on the ground from those intended by the resources specialists who wrote the prescriptions. Verifying that implementation complies not only quantitatively but qualitatively with the management decision is especially important when the third step of monitoring is intended, as effectiveness can only be meaningfully analyzed if the actual treatments outcomes are in compliance with the intended outcomes. Specific qualitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 3) Multi-tier and multiple scales effectiveness monitoring. The purpose of the effectiveness. monitoring is to answer the question: "Do the outcomes of the management decision produce the intended effects?" The need for effectiveness monitoring increases rapidly with the complexity and spatial and temporal scopes of the management actions undertaken, especially in projects where cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions. Landscape scale forest restoration over 2 million acres in 20 years, as endeavored in the 4FRI project, is largely inconceivable without the concept of adaptive management. However, adaptive management is but an empty rhetoric, and any management action and the NEPA analysis thereof is flawed if robust three step monitoring as described here above is not planned and implemented. Specific effectiveness monitoring processes can be defined at the planning stage and specific resources requirements can be calculated at the planning

implementation meets the purpose and need and forest plan standards and guidelines. It is also the foundation for the formal silvicultural prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions"□ (DEIS, page 601). Furthermore, appendix E of the FEIS provides a plan for not only additional implementation and compliance monitoring, but also effectiveness monitoring. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively work with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols. The multi-party monitoring board is developed independently within the stakeholder group. If provided prior to publication, a stakeholder developed document outlining the structure of the board can be included in an appendix to the FEIS. As outlined in the collaboratively developed adaptive management and monitoring plan, the multi-party monitoring board will work with the USFS, where appropriate, to oversee monitoring prioritization, implementation, data storage and assessment. Furthermore, the plan states that the stakeholder group (and by association, the monitoring board) will provide adaptive management recommendations to the Forest Service based on the monitoring information collected.

	stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. A three functional steps monitoring process articulated as above can be easily adapted to the three priority tiers identified in the 4FRI stakeholders suggested monitoring plan (2012) and the three . monitoring scales identified in Appendix E Alternative B through 0 Monitoring and Adaptive Management Plan (DEIS p. 660). In presenting the above monitoring process, Greenlee County does not intend to propose an alternative to the stakeholders developed Biophysical and Socioecanomic Monitoring for the Desired Conditians of the Four Forest Restoration Initiative 2¦ill1 but to suggest a framework for the associated monitoring 'action plan' or 'work plan' and budget required under FSM Sec. 1921.51 (4) & (5).	
Pearson, Yvonne	Greenlee County respectfully suggests that the 4FRI DE IS include in very specific terms the requirements for the Responsible Officials to be bound by the findings of multi-party monitoring boards. It is not suggested here that responsible officials surrender their decision making authority to a multi-party monitoring board, or violates the requirements of FACA, but that they should be required to act upon the findings of a multi-party monitoring board in a manner that appropriately addresses the issues raised.	(158-65) As described in appendix E (Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan, also known as the Adaptive Management and Monitoring Plan, or AMMP), the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. The deciding official will then consider potential adaptive management actions and make a final determination. However, the Government cannot surrender its decision making authority to the multi-party monitoring board.
Pearson, Yvonne	Greenlee County observes that the words 'adaptive management' are used in 61 distinct instances throughout the 4FRI DEIS, and that adaptive management is referred to, throughout the entire 4FRI DEIS, as an integral part of the 4FRI project and as a management tool fully integrated in the 4FRI NEPA process. The County applauds the commitment of the USFS 4FRI Team to adaptive management, as projects on the scale of 4FRI (~2 million acres in 20 years), or even the first DEIS of 4FRI (~1 million acres in 10 years), where direct, indirect and cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions, are largely inconceivable without the concept of adaptive management. However, Greenlee County observes that aside from a five line description in the Glossary (DEIS p. 341), and a nine line general description in the Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 661-662), there is no	(158-66) The comment refers to the 2012 Planning rule; however, 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity". In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management. We agree that the site specific monitoring and adaptive management plan in the DEIS was incomplete. Please refer to Appendix E and the updated AMMP in the FEIS for a more detailed definition of the adaptive management process including clarifying figures and adaptive management activities proposed in response to threshold triggers.

	presentation or description in the 4FRI DEIS, the specialists reports or the project record, of the adaptive management process. The entire adaptive management plan for the 4FRI project is described as follows: "Monitoring of alternative management actions provides the data for the adaptive management process. As a result of comparing monitoring results to the predicted outcomes, the plan provides a road map for adjusting actions or applying new science as long as the anticipated effects are within the scope of impacts analyzed and disclosed in the EIS and record of decision" (DEIS p. 661-662). The fundamental issues of characterization of system uncertainty through multi-model inference; definition of temporal and spatial scales; indicators selection; analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; identification of thresholds; evaluation of strategic alternatives; amplitude, timing, scale and iteration of corrective actions; etc., are left untouched. Additionally, as mentioned in the above section Monitoring, Greenlee County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more an attempt at an adaptive management decision matrix rather than an effectiveness monitoring plan per se. The table includes some indicators, triggers, and adaptive actions based on landscape scale desired conditions, but many adaptive actions applying to macro level desired conditions are "discontinue" or "prohibit until alternative approach is intend to propose an alternative to the stakeholders developed Biophysical and Socioeconomic Monitoring for the Desired Conditions of the Four Forest Restoration Initiative 2¦ill1 but to suggest a framework	
Pearson, Yvonne	for the associated monitoring 'action plan' or 'work plan' and budget required under FSM Sec. 1921.51 (4) & (5).	(158-67) Thank you for your observations. Please see previous responses.
Pearson, Yvonne	Additionally, as mentioned in the above section Monitoring, Greenlee County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more an attempt at an adaptive management decision matrix rather than an effectiveness monitoring plan per se. The table includes some indicators, triggers, and adaptive actions based on landscape scale desired conditions, but many adaptive actions applying to macro level desired conditions are "discontinue" or "prohibit until alternative approach is	(158-68) Thank you for your observations. Please see previous responses.

Pearson, Yvonne	development (sic)" or "increase" or "re-evaluate". These are binary or vague. In addition, many of the triggers timelines are 5 or even 10 years long, which may be adapted for some resources, but may not allow, for other resources, the identification of trends. And the implementation of adaptive management actions before the entire 4FRI project, or half of it, is completed. Similarly, the few lines of adaptive management narrative are vague and general: "Some of the effectiveness monitoring objectives have adaptive management actions that would be taken if the established thresholds are reached or exceeded. Alternatives B, C, and D have specific adaptive management actions for springs, channels, and roads that have been made part of the alternative (see DEIS chapter 2)" (DEIS p. 662). Greenlee County is concerned that adaptive management is only a concept at this stage; that the specialized techniques and processes of adaptive management may not be fully grasped; and that adaptive management has not been truly engineered into the 4FRI project as an executable management mechanism integral to the 10 year implementation of the 4FRI EIS over one million acres. Further, Greenlee County is concerned by the reaction to date of the USFS 4FRI Team to such observations: "Adaptive management is not a NEPA requirement." The County is concerned that, while it is correct that adaptive management is indeed not a NEPA requirement in the 1982 Planning Rule, it has become one under the 2012 Planning Rule (Forest Service Handbook FSH 1909.12 - 41). Maybe more importantly, the County is concerned that by making adaptive management a key process of the 4FRI NEPA analysis, the USFS 4FRI Team has in effect constrain ned itself i nto designi ng and implementing a true adaptive management process. Therefore, Greenlee County is concerned that the absence of a robust adaptive management process, despite the stated reliance on adaptive management to implement restoration treatments on one million acres over 10 years, may present a process risk for the 4FRI DEIS. Consequently, Greenlee County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a structured adaptive management plan, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its	(158-69) Thank you for your comment. See previous responses.
Pearson, Yvonne		(158-70) The comment refers to the 2012 Planning rule. Please see the response to #158-4 for information about the relevant rule planning rule under which the 4FRI was initiated. However, the 2012 Planning rule at 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity"□. In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management.

	plans and policies and in these comments.	
Pearson, Yvonne	Suggested action Greenlee County respectfully suggests that the USFS 4FRI Team develop and include in the 4FRI EIS a robust adaptive management plan that includes standardized processes such as: Characterization of system uncertainty through multi-model inference; Definition of temporal and spatial scales; Analysis of indicators selection; Analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; Analysis of thresholds; Analysis of strategic alternatives; and, Analysis of amplitude, timing, scale and iteration of corrective actions.	(158-71) Thank you for your suggestions. The adaptive management and monitoring plan was developed in collaboration with stakeholder group through an open and public process. This process involved in-depth multi-party discussions on a wide range of socio-economic and ecological issues. Since its inception, the plan was intentionally designed to be a living document that will adapt over the course of the project as information is gained and new questions are revealed. In January of 2014, the current iteration of the adaptive management and monitoring plan was approved by the 4FRI stakeholder group for inclusion into the FEIS. Your participation in that process is appreciated. We feel that the plan is a robust and well thought out document that establishes the proper framework for the Forest Service to not only monitor the effects of restoration activities, but also adapt as new information is made available.
Pearson, Yvonne	Planning Process Issues In its review of the proposed directives revising the Forest Service Handbook (FSH 1909.12) and the Forest Service Manual (FSM 1920), and establishing procedures and responsibilities for implementing the 2012 National Forest System Land Management Planning Regulation set out at 36 CFR part 219, Greenlee County identified issues and shortcomings that are likely to affect the 4FRI DEIS. Greenlee County fully understands that the opportunity to comment on the 4FRI DEIS is neither an opportunity to comment on the 2012 Planning Rule, nor on its implementation directives. Nonetheless, precisely because the 4FRI DEIS will establish the parameters for all subsequent management actions in the 4FRI project for the upcoming 10 years or more, the County believes tliat it is appropriate for the 4FRI EIS to specifically include and, therefore, integrate into any subsequent management action, guidelines on: i) how to use of best available scientific information to inform the land management planning process; ii) public participation and the role of collaboration; and, iii) the objection process.	(158-72)Please see the responses to the individual issues such as the use of best available science, public participation and the 36 CFR 218 objection process.
Pearson, Yvonne	However, Greenlee County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials in actually integrating social and economic sustainability and multiple uses, and in integrating social and economic science to the framework of best available scientific	(158-73) Thank you for expressing your opinion. Please see all previous responses.

	information to inform their land management planning process, and their management decision making process. Specifically, the assessment of the social,cultural and economic values becomes essentially an exercise in futility if these values are not reflected in the management decisions, and do not balance other values. This lacking is reflected in the 4FRI DEIS. Greenlee County clearly supports robust science and the full integration of ecological, bio diversity, restoration and conservation values in the management process, and the County is on record for participating in, and often leading,efforts designed to re-introduce to the ecosystems of eastern Arizona natural ecologically sustainable processes such as a frequent cool surface fire regime. Nevertheless, the County is observing, and when necessary is committed to mitigate, a tendency to develop and implement pure, uncompromised and uncompromising science, or the currently accepted state of best science - which often proves to be a temporary state, to the detriment of the enjoyment, custom, culture, health, safety and economic well-being of the people. Additionally, Greenlee County is also observing, and when necessary is also committed to mitigate, the fact that the same temptation to develop and implement pure, uncompromised and uncompromisingscience, also often causes the weakening of the social consensus with stakeholders who would support the implementation of management decisions based on a balanced approach, but are unwilling to support the invasive implementation of a monolithic and intransigent interpretation of science. For example, many stakeholders are reluctant to support unconditionally the 4FRI DEIS, owing to the science-based decision to cut some of the large trees necessary for the development of the future old growth, in order to create regeneration openings in the name of scientifically driven silviculture. Such decisions may make sense at group level, in forests featuring well balanced classes of vegetative structural stages (VSS), but are difficult to support at stand level or forest level in forests where older VSS classes (VSS 5 and 6) are in recognized deficit at landscape scale, while younger VSS classes (VSS 2, 3 and 4) are overabundant, choke the landscape, and transform it into a ticking fire bomb.	
Pearson,	Greenlee County suggests that the 4FRI EIS provide clear and	(158-74) Please see the response below to #158-76.

Yvonne	unambiguous guidelines to responsible officials to integrate social sustainability and social science into the framework of best available scientific information to inform their management decision making process. Specifically, Greenlee County suggests that the 4FRI EIS guide responsible officials to implement substantive - even though possibly scientifically imperfect - management actions that move the ecosystems significantly toward the desired future conditions, when such actions are supported by social consensus, rather than spend years attempting to forcibly impose management actions that may be deemed scientifically more perfect but that do not benefit from the support of the social consensus. In other words, the County suggests that the 4FRI EIS emphasize executing well less than perfect projects now, over developing scientifically perfect projects that are not implemented. To quote a famous Arizonan: "Extremism in the defense of liberty is no vice" (Barry Goldwater), but Greenlee County would like to propose to the USFS 4FRI Team that extremism in the pursuit of best available scientific information (BASI) may become counterproductive when it results in paralysis by analysis, or inaction by litigation. Greenlee County appreciates and supports the important role given to public participation and the role of collaboration in the proposed directives and in the 4FRI DEIS. Issue However, Greenlee County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials on two fundamental and overlapping aspects of public participation and the role of collaboration. Specifically: i) sustained and meaningful public participation and engagement require that the public's input actually influence substantially the decision making process; and, ii) sustained and meaningful collaboration requires that the products of collaboration be honored by the Forest Service. This lacking is reflected in the 4FRI DEIS. Greenlee County has acquired a long, ineffective, inefficient, unproductive and oftentimes frustrating experience of responsible officials paying lip service to public participation and to the role of collaboration, and the County believes that the 4FRI EIS must focus the concept of public	
Pearson, Yvonne	participation and collaboration away from complying with a process and 'managing the problem,' toward developing executable products	(158-75) Please see the response below to #158-76.

	and 'resolving the problem.'	
Pearson, Yvonne	Suggested action Greenlee County recognizes that under current federal statutes Forest Service line officers are not allowed to share their decision making authority. Nonetheless, the County believes that a statutory monopoly of decision making authority does not necessarily imply an operational monopoly on decision content. Therefore, the County suggests that the 4FRI EIS emphasize that while the line officers retain their sole legal ability to make the decision, they are also required by law and regulation "to meet the needs of present and future generations" (Forest Service Mission Statement), as expressed through true public participation and collaboration, and meaningful consistency reviews with the local governments' objectives, among other channels. Greenlee County further suggests that the 4FRI EIS guide responsible officials in retaining their legal decision making authority while allowing the public to participate meaningfully in, influence substantially, and, when appropriate, contribute to alter the content of their decision.	(158-76) The 4FRI planning effort has lived up to the spirit of authentic collaboration since the inception of the idea to restore 2.4 million acres across northern Arizona. A working relationship was built with the stakeholder's group, and beginning in 2010, collaborative planning efforts include but are not limited to, the use of the stakeholder's Landscape Restoration Strategy to inform the purpose and need and proposed action for this project. In addition, the stakeholder's group produced the Large Tree Retention and Old Growth Protection Strategy which was used to inform alternatives and the modified version is incorporated in the project's implementation plan. The collaborative effort continues with the participation of the stakeholder group in developing the adaptive management and monitoring plan which is included in the FEIS. Evaluating monitoring information and data gathered about the ecological and socioeconomic components affected by restoration activities creates the feedback necessary for making any adaptive management decisions. As described in appendix E and the AMMP, the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. Because the Forest Service can neither abdicate its legal responsibilities nor delegate decision-making to the collaborative group, the deciding official will consider potential adaptive management actions and make a final determination. All collaborative decisions still need to move through procedures for agency evaluation and accountability.
Pearson, Yvonne	Objection Process Greenlee County appreciates the attempt made by the Forest Service to: i) allow the public a more effective involvement; ii) support the collaborative processes; and, iii) develop better decision-making (U.S. Forest Service Chief Tom Tidwell) by replacing the previous appeal process with the new pre decisional administrative review, or "objection process", to be applied under federal regulation to all projects and activities that implement land-management plans and that are documented in an environmental assessment or environmental impact statement. Greenlee County acknowledges that the U.S. Forest Service announced on March 26, 2013 the final rule governing the objection process for projects and activities implementing land-management plans, and that the final	(158-77) Thank you for your comment.

	rule was published in the Federal Register on March 27, 2013 after a review of public comments submitted in response to the publication of the proposed rule in 2012. Consequently, the County fully understands that this comments letter is not an opportunity to comment on the objection process. However, Greenlee County believes that the recent decision made by the Forest Service to replace the previous appeal process with the new objection process in the 4FRI NEPA process does provide an opportunity to address concerns about the objection process implementation, as follows. Among other significant differences, a critical difference between the previous appeal process and the new objection process is that an objection must be filed prior to an actual decision being made and published. This creates a potentially difficult situation inasmuch as there is a possibility, and in certain cases a probability, that several objections may be filed by several different parties, and that the resolution of these objections may result in a final decision significantly different from the one disclosed in the document published with the notice of a plan subject to objection. Although the list of objections will be public, the timing of filing of potential objections within the objections filing period may result in the requirement for the public to decide to file, or to abstain to file an objection based on the speculation of what other parties may decide to file, and what the resolutions to such objections might be. Additionally, since a final decision may be influenced significantly by the resolution of an objection that, by definition, happens only after the comments period is closed, parties may be unwillingly put in a situation where, per 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments, their potential objection may be ineligible. Additionally, Greenlee County is concerned that Chapter 50 Objection Process in general, section 51.66 - Reviewing Officer Response to Objections and section 51.6 - Resolution of Objections in particular, and specifically section 51.6 paragraph 4: "The reviewing officer responds to the outstanding issues in the objection; The reviewing officer's response may include instructions to the responsible official as part of the disposition of the objection. The response must be sent to the objecting party(ies) by certified mail, return receipt requested, and posted online" (36 *CFR	
Pearson, Yvonne		(158-78) Please see the response to #158-62.

	219.57(b) and sec. 51.64) are focused on the administrative process of disposing of an objection, rather than on the substantial process of actually resolving it. Suggested action Greenlee County suggests that the 4FRI EIS guide the reviewing officers to exercise careful judgment in their resolution or rejection of objections, in relation to the true material importance of the objections - as opposed to their symbolic or emotional importance, and the potential effect of litigation on the implementation of the project. The County suggests that a careful and dispassionate costs I benefits analysis be conducted between the minor *ecological or silviculture costs possibly attached to some stakeholders' objections, and the major benefits attached to sustaining the 4FRI social license. In so suggesting, Greenlee County wants to emphasize that it does not promote indiscriminate and aberrant acceptance of any and all parties' whims or irrational demands, but a well-considered costs and benefits analysis by Forest Service responsible officials, line officers and reviewing officers of public input in their decision process in view of the relative actual significance or lack thereof of such input, and the overwhelming urgency to act, even if imperfectly in some specific cases, such as the	
Pearson, Yvonne	protection of the forests of eastern Arizona against catastrophic landscape scale wildfires. Summary In summary, Greenlee County wants to re-state its overwhelming support for the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the suggestions provided by the County and other stakeholders integral to the sustainability of the 4FRI social license. Therefore, the concerns and suggestions provided by Greenlee County are not aimed at questioning the need to implement 4FRI, but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process that could be of a nature to compromise a non-conflictual and non	(158-79) Thank you for your comments and concern for this restoration project.
Pearson, Yvonne	litigious implementation of the 4FRI project, as intended by the County Greenlee County is fully aware that per Sec. 1503.4 Response to	(158-80) Thank you for your comments and support of this landscape-level restoration effort.
Pearson, Yvonne	comments, the USFS 4FRI Team may elect to "Explain why the comments do not warrant further agency response, citing the	(158-81) Your comments have been noted. Thank you for your involvement in the 4FRI DEIS comment process.

	sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response" (Sub Sec. 5). However, this is not the expectation of the County. Rather, the County expects that the USFS 4FRI Team will receive the County's comments in the spirit of continuous improvement and risk mitigation in which they were written, and elect to "Modify alternatives including the proposed action" (Sub Sec. 1), and "Supplement, improve, or modify its analyses" (Sub Sec. 3) as allowed for under Sec. 1503.4 Greenlee County respectfully submits that the above comments and suggestions are substantive in nature and warrant careful consideration and adoption by the Forest Service. Greenlee County requests to be kept informed as the 4FRI NEPA process progress; hereby reserves its right to provide further comments as the process unfolds; and, requests that the Forest Service commit to receiving and integrating further comments from the County as provided. Greenlee County appreciates the opportunity to comment on the 4FRI DEIS and thanks the USFS 4FRI Team for this opportunity. The County is committed to partner with the U.S. Forest Service to meet	
Pearson, Yvonne	the County's residents' and visitors' enjoyment, custom, culture, health, security and economic well-being needs	(158-82) Thank you for your comments.
Pinckard, Elaine	hear you are going to burn 1 million acres of forest and wipe out habitat for bears, birds, and squirrels, fueling climate change and sending choking fires toward Santa Fe and Arizona cities. This does not seem like a good idea. Please reconsider.	(84-1) Thank you for your comment.
Provencio, Henry	In reading the Draft EIS and preparing my comments, I keep getting referred to the Fire Ecology, Fuels and Air Quality Specialist Report. None of the Specialist Reports links are functional on the http://www.fs.usda.gov/main/4fri/planning website. Can I please get an electronic copy of the Fire, Ecology, Fuels and Air Quality Specialist report?	The issue with using the comment database was resolved by 4FRI IDT leader Henry Provencio on May 24, 2013.
Provencio, Henry	LETTER #99 SUPERCEDED BY LETTER #72 (HAS COMPLETE LETTER FROM COMMENTER)	(99-1) This is a duplicate entry of letter #72 from FONAF. The responses to those comments are #911-913.
Provost, Clifford	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI)	(108-1) Thank you for your comments. Please see our response to letter #19.

and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Pynn, Jessica	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture,	(54-1) Thank you for your comments. Please see our response to letter #19.

Ramirez, Celina T	habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. SRP is a multi-purpose federal reclamation project authorized and constructed under the Reclamation Act of 1902, 43 U.s.c. § 371 et seq. Pursuant to various contracts with the United States, SRP operates the Project works, which include, among other things, two dams and their associated reservoirs on the Verde River, four dams and their associated reservoirs on the Salt River, and C. C. Cragin dam and reservoir on East Clear Creek. Water from the Verde, Salt, and East Clear Creek watersheds is stored by SRP in these reservoirs and conjunctively managed for subsequent delivery to municipal, industrial, agricultural and tribal water rights holders. SRP actively supports science-based management strategies that improve our role in core areas of water delivery, water supply development, water operations, and inovative water resource management.	(105-1) Thank you for your explanation of SRP's interest in the 4FRI restoration project.
Ramirez, Celina T	SRP Supports Alternative C (the preferred alternative) SRP supports the Preferred Alternative (Alternative C). This alternative would mechanically treat 434,001 acres of vegetation and utilize prescribed fire on 593,211 acres. In addition, Alternative C includes actions to address Increased Restoration and Research components that were brought up as a key issue during the scoping process. Should the final selected alternative identify one of the other three alternatives, SRP requests that Coconino and Kaibab National Forests consider SRP's role in managing water resources for the benefit of downstream users, the protection and enhancement of water resources, and our funding and utilization of resources to study and quantify the benefits of restoration activities.	(105-2) Thank you for your comment. Your support of the preferred alternative (C) has been noted.
Ramirez, Celina T	Forest management, including fire suppression over the past 100 years on National Forest lands has resulted in reduced forest health. Current condition includes: even¬aged ponderosa pine that lacks age class diversity; unnatural spatial patterns, where forest stands lack desired openings; and,an overall increase in stand density.These conditions have created a forest with a high threat of catastrophic wildfire. Currently, 34 percent of the treatment area has crown fire potential; crown fire generally produces 100 percent mortality in	(105-3) Thank you for your comment on the purpose and need for this landscape-scale project to restore the ponderosa pine ecosystem on the Mogollon Rim.

Ramirez, Celina T Ramirez, Celina T	ponderosa pine communities. With the increased risk of wildfires on these National Forest lands, SRP has concerns over negative hydrologic effects to the watershed downstream of these potentially catastrophic fires. Runoff and water yield, peak flows and low flows, erosion and sedimentation, and water temperature and chemistry can all be impacted by unnatural forest conditions and severe wildfires. All three treatment alternatives (B, C, and D) move the forest in the direction of a more desired condition. These treatment alternatives will move even-aged stands toward an uneven-aged structure,will work toward creating a mosaic of interspaces and tree groups of varying sizes and shapes,s and will create a forest structure that ranges from very open to closed canopies.Treatments associated with Alternative C would have the greatest impacts on reducing the risk of catastrophic fires. With Alternative C the risk of crown fire drops from 34 percent to 4 percent by 2020 at the landscape leve1.Relative to watershed function, all three treatment alternatives (B, C, and D) would maintain or improve long-term soil productivity and watershed function. Vegetation treatments at the watershed scale combined with prescribed burning could restore or improve hydrologic function of 74 springs and select channels.ll Under Alternative C, riparian and wetland function are expected to improve slightly more than under alternatives B and D since more acres would receive mechanical vegetation treatments. More acres would be subjected to low severity prescribed fire under Alternative C, decreasing rainfall interception and evapotranspiration losses. Groundwater recharge and storm water runoff would be slightly higher than under alternatives B and D. Because more acres of grassland would be restored under alternative C, there is increased potential for improvement in riparian ecosystem function where wetland or riparian species occur in restored grasslands.In addition, under Alternative C, water yield would be expected to be slightly higher since there would be more forest openings and less dense forest conditions. Snow interception by tree canopies would be reduced under Alternative C, potentially increasing winter snowpack. As the Coconino and Kaibab National Forests plan to move forward in improving existing forested landscapes and vegetation	(105-4) Thank you for explaining your support of alternative C and the watershed benefits derived from its implementation, (105-5) Thank you for your comment. Your concern for the health and functioning of the watershed is noted.

Ramirez, Celina T	communities to reflect a more desired condition, there not only will be impacts on the various ecosystems but also impacts on the hydrological characteristics of the watershed. Consequently, SRP has significant interest in ecosystem management and the health of the forested lands that constitute the watersheds above SRP's reservoirs. As stewards of the water resources for SRP's shareholders, our interest lies in understanding how restoration activities will influence the dynamics of the watershed hydrology, water quantity and quality, and sediment loads. SRP has been heavily involved in and has worked in support of partnerships, restoration actions, and on-the-ground projects. SRP is interested in understanding both the impacts of restoration activities on the watershed and the ecosystem and the best methods of quantifying those impacts. SRP has been working with Northern Arizona University's Ecological Restoration Institute to design a Paired Watershed Study. This study proposes to look at quantifying changes in hydrologic and natural resource conditions. The research project would investigate several sub-watersheds within the major watershed and would research the outcomes of several different treatment types at each sub-watershed study area. As such, SRP strongly supports Alternative C because it is the only Alternative that includes a research component as part of the proposed action. In conclusion, SRP understands that all three Alternatives (B, C, and D) move the Coconino and Kaibab National Forests toward a more desired condition by reestablishing and restoring forest structure and pattern, improving vegetation composition and diversity, and generally improving forest health and hydrologic conditions. However, Alternative C would have the greatest impacts toward achieving these objectives, and includes a research component that SRP considers to be an important aspect in developing our knowledge of watershed restoration.	(105-6) Thank you for your comment concerning the Paired Watershed Study research component of alternative C.
Ramirez, Celina T		(105-7) Thank you for commenting on this restoration project. Your strong support of alternative C has been noted.
Richard, Michelle	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using	(68-1)Thank you for your comments. Please see the response to letter #19.

	prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Ritchie, John	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I	Thank you for your comment. Please see our response to Letter #19.

have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact

	Statement for the 4FRI project.	
Roberts, Jenny	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and cienegas. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan.	(20-1) Thank you for your comment. Please see our responses to Letter #19.
Roberts, Jenny	The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species.	Please see our responses to letter #19.
Roberts, Jenny	The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape.	Please see our responses to letter #19.
Roberts, Jenny	Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees with a few narrow limited exceptions for some of the larger trees. The Forest Service should make this document on large tree retention an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests.	Please see our responses to letter #19.
Roberts, Jenny	The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation	Please see our responses to letter #19.

	and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change.	
Roberts, Jenny	Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	Please see our responses to letter #19.
Rockwell, Clyde	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and	(65-1) Thank you for your comments. Please the response to letter #19.

	larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Rogers, Ann	I was aghast when I read of your planned burn. Don't we have enough fires to fight without planning some? The CO2 this would release would be horrible, to say nothing about the loss of sinks for the pollutant. And what about the loss of habitat? The Kaibab and Coconino forests are some I have hiked in and enjoyed. What you are planning makes me very sad. Plant more trees instead!	(138-1) Thank you for your comments. See the DEIS, "Climate Change" section for a discussion on how the alternatives would affect carbon release. Please refer to the DEIS, chapter 1, purpose and need, for the discussion on the current condition of wildlife habitat. See the DEIS, chapter 3, wildlife section, for the anticipated short and long term effects to wildlife habitat.
Romesburg, Denise	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings	Thank you for your comment. Please see our response to Letter #19.

	outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Rose, Amanda	I do not support the proposed elimination of the Ponderosa Pine nor the loss of habitat for the Mexican Spotted Owl. Nor do I support the plan to burn every 5 years. This seems like an attempt to have a human brain decide the better choice of tree and animal, and I do not think we should be making such decisions, but rather, live with what is naturally given by the earth. I find humans mess things up way too often.	(78-1) Thank you for your comment. Please see chapter 3 of the DEIS for the effects to ponderosa pine (DEIS, chapter 3, "Vegetation" section) and wildlife (DEIS, chapter 3).
Rosenstock, Steve	The Department appreciated the opportunity to participate as a cooperating agency in preparation of the 4FRI DEIS, the largest forest restoration project yet undertaken in the western U.S. Our partnership will help ensure that 4 FRI yields the greatest possible benefits to Arizona wildlife and people who value those resources. The Department likewise appreciated the open, transparent, and collaborative approach taken by the Forest Service and incorporation of the recommended watershed and wildlife research efforts. We look forward to continued cooperation with USFS to make this landmark effort a success on the ground. Our general and specific comments on the DEIS follow.	(113-1) Thank you for your participation in this project. The AGFD provided invaluable input (data, effects analysis) to the EIS.

Rosenstock, Steve	The Old Tree and Modified Large Tree Implementation Plans address challenging social concerns, while providing a science-based framework for retaining ecologically-valuable old trees and providing flexibility needed to meet restoration objectives across a complex landscape. We encourage using similar approaches where appropriate, in future restoration efforts on other Arizona forests. The Bridge Habitat section of the DEIS does much to address concerns expressed by some stakeholders about the degree of forest openness following treatment and potential effects on canopy-associated wildlife. It would be helpful if these spatial data could also be presented in a temporal context, i.e., illustrating progressive change at multi-year intervals over expected duration of the project. We understand that an analysis of this type may not feasible at project area scale; however an example at watershed or similar level would be informative.	(113-2) Thank you for your comments. We considered your recommendation to temporally address changes in habitat. Currently, the assumptions used to evaluate impacts to wildlife include short and long term (as defined by each resource specialist). Adding progressive change over time within the expected duration of the project would be problematic since the sequencing is not part of the NEPA. Without knowing the specifics of where and when particular areas would be treated, the resulting information would be speculative. As such, finer temporal detail of the effects would provide little added benefit as compared to a qualitative description that implementing treatments at the landscape scale will continue to provide patch work of the current, dense conditions across the landscape until the implementation has been fully completed.
Rosenstock, Steve	The Department welcomes the focus on grassland restoration. Restoring encroached and degraded grasslands will have considerable benefits to pronghom and other grassland-associated wildlife. In planning these treatments, it is important to ensure connectivity between extant grasslands and areas that will be restored. Please coordinate with our staff to help prioritize and coordinate these efforts. Riparian, wetland, and spring habitats are uncommon on the project area and of tremendous importance to wildlife. The Department welcomes and supports active improvement and restoration of these areas. Please coordinate with our staff to help prioritize and coordinate these efforts.	(113-3) The AGFD was an active part of the interdisciplinary team when the grassland strategy was developed. We used soil types to guide these actions and corridor maps provided by the AGFD to reestablish connectivity outside of designated MSO habitat. The AGFD also assisted in developing the riparian strategy.
Rosenstock, Steve	Given the spatial extent and duration of the project, it would be helpful if fire and thinning treatments and their effects were analyzed with greater temporal resolution, i.e., more than just before/after snapshots. It would also be helpful if the fire ecology section of the DEIS addressed the potential for large wildfires that could occur on the analysis area during implementation.	(113-4) Sequencing is not a part of the NEPA process, but will be managed by the districts/forests as they implement treatments. Treatment areas are/have been prioritized based on input from the public and forest priorities. These priorities are considered by the forests/districts when they plan for and implement prescribed fires. The fire ecology analysis did address how ongoing and foreseeable projects would affect fire behavior across the landscape (Fire Ecology Report, pp. 260-274).
Rosenstock, Steve	The Preferred Alternative includes decomissioning 770 miles ofexisting roads and 134 miles of unauthorized roads, previously identified through the Travel Management Rule (TMR) process. The	(113-5) Thank you for providing input into the previous TMR process. The TMR process identified a need to decommission approximately 770 miles of existing system and unauthorized roads on the Coconino NF.

	Department previously provided comments on travel management for areas included in the 4FRI EIS. We remain committed to fulfilling our public trust responsibilities, preventing resource damage and ensuring that the public has adequate motorized access for wildlife-oriented and other recreational activities.	This number was refined in the FEIS to 726 miles. On the Kaibab NF, approximately 134 miles of unauthorized roads (often referred to as user-created routes) were recommended for decommissioning". This analysis focuses on the environmental impacts associated with decommissioning existing roads, unauthorized routes and providing adequate toad access to the project to facilitate implementation. The environmental consequences for transportation are located on page 318 to page 321 of the DEIS (web version).
Rosenstock, Steve	Treatments on much of the analysis area reflect a regulated forest, sustained yield paradigm, which appears somewhat at odds with the considerable volume of material on natural range of variability, disturbance regimes, and restoration practice cited in the DEIS. For example, the Department has previously expressed and continues to have uncertainty about the use of regeneration openings in the context of forest restoration. That said, we understand that they reflect current guidance in the Forest Plans. However, for future projects, we encourage including alternatives that are more oriented toward ecologically-based restoration.	(113-6) In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a “read the land” approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the “red zone “density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration.

What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

Rosenstock, Steve

The Adaptive Management component of the 4FRI project will be key to its success, but is incomplete in the DEIS. The Department

(113-7) Thank you for your comment. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive

	recommends continued engagement with the 4FRI stakeholder group to complete this critical element.	Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation.
Rosenstock, Steve	The DEIS acknowledges that the preferred alternative will put the analysis area on a trajectory toward restoration but doesn't speak to "what next." When mechanical thinning is completed, will the landscape be maintained by natural and prescribed fire? Or will subsequent entries of mechanical thinning be needed? It would be helpful to give a sense of the long-term management strategy for the area.	(113-8) Thank you for your comments. The preferred alternative would move towards, but not achieve restoration. Therefore, we expect additional mechanical treatments would be needed in the future in addition to the use of fire. Many areas are expected to need future treatments due to the amount of even-aged forest on the landscape and because of forests being inherently dynamic. Specifics in regards to types of future treatments are beyond the scope of this NEPA. Prescriptions for future restoration activities would be guided by land management objectives which encompass present and future values. Maintenance burning for the duration of the project is included in the analysis.
Rosenstock, Steve	1. (Chi :Table 3). Please indicate percent interspace ranges (Silvi Report p 33) for canopy openness categories.	(113-9) Thank you for your comment. Table 3 in the FEIS provides the openness categories. The vegetation section in Chapter 3 provides the range of openness. The silvicultural analysis has been expanded to include an evaluation of how alternatives move towards the natural range of variability.
Rosenstock, Steve	1(ChI: p21). Please provide more detailed plant community description for "pine-sage" type.	(113-10) Thank you for your comment. While the description in chapter 1 of the DEIS (and FEIS) remains concise, more detailed information can be found in the fire ecology specialist report. For example, the (FEIS) fire ecology report states on page 53, "Desired conditions are to maintain and enhance the sage understory and restore the overstory/understory pattern within the pine-sage mosaic. There are few sources that describe this association. One that does is the Terrestrial Ecological Survey (Brewer et al.1991). According to the survey, there are about 16,064 acres in RU6 with potential vegetation that could include both ponderosa pine and big sagebrush. Monitoring on the KNF identified Artemisia tridentata var. (big sage), and monitoring at the adjacent Grand Canyon National Park identified A. nova (black sage), though it was far less common than big sage (USDI 2011).There are no baseline data available that represent current conditions within the project area though, based on the ecology of the species present and a 1991 survey (Brewer et al.1991), some assumptions can be made. The desired condition for the sage component of the pine/sage community is a shifting mosaic of

		sagebrush with a mix of age classes which is regulated primarily by fire. Fire scar analysis that included ponderosa pine on one of the four soil types that support pine and sage indicated an average fire return interval of roughly seven years for surface fires (Huffman et al. 2006)". The wildlife report provides considerable detail on pine-sage. The wildlife report on pages 43-44 (for FEIS) states, "Pine-sage includes a ponderosa pine overstory with Wyoming big sagebrush (Artemisia tridentate, ssp.wyomingensis) as the most common in sage the understory. Also potentially present, but much less common, is black sage (A. nova), Basin big sagebrush (A.t. ssp. tridentata), Bigelow sagebrush (A.bigelovii), black sagebrush (A. nova), and sand sagebrush (A. filifolia). Other species growing in association with sage include rabbitbrush (Chrysothamnus spp., Ericameria spp.), saltbush (Atriplex spp.), and succulents (e.g., yucca [Yucca ssp.], cactus [Opuntia ssp.]). Understory vegetation includes tall- and low-growing grasses and forbs and well-developed cryptobiotic crusts. Species composition varies by location. Plant cover is usually not continuous. Fire disturbance is highly variable in type and frequency across elevation and moisture gradients and site productivity.".."Sagebrush provides habitat for migratory bird species, many of which are in decline across the country. Overall, wildlife species diversity may be lower in sagebrush systems than in habitat types with greater vertical complexity, but the species that occur in sagebrush systems often occur nowhere else. Populations of many bird species that depend on these ecosystems are in decline, and many have special conservation status. On the Kaibab NF, species that depend on shrub steppe habitat include Brewer's sparrow, vesper sparrow, sage sparrow, and sage thrasher (AZGF species of greater conservation needs), green-tailed towhee, black-throated sparrow, and gray vireo (USFWS species of management concern)".
Rosenstock, Steve	2(Appendix 3: p 707). Please add definition of "Mid-scale" at first mention, as done for Landscape Scale (p 699).	(113-11) Appendix 3 refers to the wildlife report. The term mid-scale is explained on page 260 of the FEIS wildlife report as being 100 to 1,000 acres.
Rosenstock, Steve	I. (Table 2, p 165). Fawning dates for deer are stated as May IS-August 31. Deer-fawning in the 4FRI area would be later, from July IS basically to Aug 31. Please modifY accordingly.	(113-12) Thank you for this comment. The fawning dates have been changed in the wildlife report and appendix C of the FEIS (Appendix C, W48). Design feature W48 states, "In known deer fawning areas defer logging activities between June 15 and August 31 because of declining trends in populations.

Rosenstock, Steve	1(Table 2, p 165). With respect to roosting habitat for turkey, clumps of older-aged trees along ridges and on slopes above drainages in forests above the transition zone are also important. Please modifY accordingly.	(113-13) Thank you for the comment. A wildlife design feature (W45) in the FEIS has been modified to read, " In turkey foraging and roosting cover, retain medium to high canopy cover in ponderosa pine stringers in the pinyon-juniper transition zone and retain clumps of large and old trees along ridges and slopes above the pine and pinyon-juniper transition zone. Target low severity fire to retain yellow pine and roosting cover". In addition, the description of turkey roost habitat has been updated in the "MIS for the Coconino NF" section (FEIS wildlife report, p. 148).
Rosenstock, Steve	2(Table 2, p 165). Prescribed, broadcast burning during the nesting season for turkey (April IS-June IS) could result in loss of eggs or poults. We understand this is outside the normal window for such treatments, but nonetheless recommend deferring prescribed broadcast burning during this period.	(Comment 113-14) The comment was not incorporated into the FEIS. It is important to return characteristic fire effects to the landscape in order to achieve the goal of restoration. It is important to get fire on the ground during spring when winds are favorable for effective smoke dispersion. The DEIS included design features (appendix C) to reduce the amount of area that can be burned in spring because of wildlife species with higher concerns such as Mexican spotted owls (W18, W21, W24), bald and golden eagles (W6), and northern leopard frogs (W36, W37, & W38). However, it is expected that burning would occur across the treatment area and would not be focused in a given area for more than 1 season per year nor would planned ignitions occur across the same ground in successive years. In addition, burn units likely average much smaller areas than what would have occurred before roads and smoke management were prevalent. Therefore, while some nests could be lost, it is not expected to impact the turkey population. Burning would also provide benefits to turkeys, including increased hiding and foraging cover, particularly for poults. Overall, the current proposal fits the evolutionary landscape within which turkeys evolved on the Coconino Plateau.
Rosenstock, Steve	3 (Table 2, p 165). With respect to pronghorn, we would recommend avoiding mechanical thinning and hauling activities in or near known pronghorn fawning areas during times when fawns are still in the hiding phase (April IS-June IS).	(113-15) We are committed to protecting fawning areas if maps are available to provide the necessary spatial component to allow for implementation planning. A design feature was added to the FEIS (appendix C), “In pronghorn fawning habitat, prescribed fire in Garland Prairie would not occur during May when most fawning occurs" (W50).
Rosenstock, Steve	The BMPs describe ways of reducing the impacts of prescribed burns and thinning activities to springs and to streams with sensitive species. These BMPs are designed to stay compliant with water quality standards of the clean water act. These BMPs are well	(113-16) The BMPs included in the aquatics report should protect individual animals, and will also protect local and downstream habitat. Monitoring of water quality is presently conducted by ADEQ, and aquatic resources (fish and invertebrates) are presently monitored by

	thought out and are likely to accomplish their intended goal. However, this document recognizes the likely impact to some locations including those with sensitive aquatic species. Please consider monitoring of water quality or aquatic resources. This monitoring is necessary for understanding the impacts of proposed activities to sensitive species within the project area. Monitoring is also necessary when determining if additional mitigation will be necessary for disturbed areas.	AGFD. For all of these reasons, this report did not suggest additional monitoring of water quality or aquatic resources. Table 148 in appendix E in the FEIS does include a compliance monitoring question that would benefit aquatics, "Were design features, BMPs, mitigation measures and forest plan requirements met for not only threatened, endangered, sensitive species, but also the other wildlife species listed in Appendix C"? Also see the "Monitoring for Composition" section of the plan.
Rosenstock, Steve	1(p 40). It is implied that Western Mosquitofish is a Sportfish within the state of Arizona. It is not. Pleas remove the term sportfish and replace with fish. 2(p 40). It is stated that Munds canyon would support native fish species if Odell Lake did not have non-native sport fish. This is speculation. Much of Munds canyon is dry during periods of drought and may not sustain any fish population during dry years.	(113-17) Thank you for your comments. Corrections have been made in the aquatics report (for the FEIS).
Rosenstock, Steve	3(p 61, 63)The terms "natural state", "natural condition" and "unnatural condition" are used when describing effects of vegetation management and prescribed fire (example p 61 paragraph 3 and p 63 paragraph I) please define "natural" or delete the term and simply define the changes described within the altered or unaltered springs	(113-18) Thank you for your comments. This issue has been resolved throughout the aquatics report (for the FEIS).
Rosenstock, Steve	In smmnary, the 4FRl DEIS reflects a fundamental and welcome shift toward restoring natural function of ponderosa pine forests in Northern Arizona and bringing these areas closer to the historical range of natural variability. The Department is pleased to express its support for the Preferred Alternative and associated Forest Plan amendments.	(113-19) Thank you for your continued support and expertise.
Sanchez, Yolanda	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that	Thank you for your comment. Please see our response to Letter #19.

	the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Santori, Nancy	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on	Thank you for your comment. Please see our response to Letter #19.

restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

Schoonmaker, Duke

is removing the population of smaller, yet essential, biodiversity of plants from the larger ecosystem the best way to preserve the natural balance which has taken thousands of years to evolve?

(13-1) Thank you for your comment. The project is designed to improve vegetation composition and diversity. The intent is not to remove small, essential populations. The web version of the DEIS at page 9 states,

Schoonmaker, Duke	If, and when, the next fire comes though after the thinning project, what will be left to re-emerge as new growth if all the young plants are removed. Isn't part of the survival tactic of the forest ecosystem to have a large number of population of species to assure some survive after a fire episode? If this population is artificially removed won't this interrupt the natural survival of the forest system?	"The purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5). The project is expected to move almost 600,000 acres toward comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects. "Page 19 to page 21 in chapter 1 of the (web version) DEIS describe existing and desired conditions for vegetation composition and diversity. The environmental consequences for sensitive botanical species (which fit the definition of small and essential populations) is displayed in the DEIS on pages 211 to 215. For at least eight of the plant species, the direct effects include the immediate loss of individual plants or population groups through management actions. In the long term, there would be benefits from reduced competition and increased amounts of sunlight and nutrients. Burning is a disturbance that can release nutrients, reduce plant competition, and increase the amount of available sunlight. Survey and mitigation would reduce the risk of increased noxious or invasive weeds and damage or loss from springs, channels, and road activities (see Rusby Milkvetch, DEIS, page 212). For all sensitive botanical species, the effects state that Alternatives B, C, and D may impact individuals but are not likely to result in a trend toward Federal listing or loss of viability. (13-2) Thank you for the concern. A key objective of the project is to increase resiliency to disturbances such as fire. Currently, over 200,000 acres (34 percent) of the project area could sustain crown fire (severe fire effects) if a wildfire were to occur (web-based DEIS, page 21). The post treatment condition reduces the risk of crown fire to 10 percent or less (web-based DEIS, page 100). For example, the (web version) DEIS at page 131 indicates that in goshawk habitat (uneven-aged and outside of PFAs) there would be good representation in all forest stages including grass/forb/shrub, young, mid-aged, and mature forest stages (VSS 1, 3-6) with the exception of VSS 2. The forest stages would be more balanced (in alignment with desired conditions) when compared to the

		current condition.
Schoonmaker, Duke	Wouldn't the removal of the plant diversity by over-thinning at this crucial time put this ecosystem further in jeopardy and threatened even more as the increased temperatures increase the mortality of the forest plants?	(13-3) Thank you for your comment. The DEIS (web version) addressed climate change on pages 321 to 328. The botany analysis found alternative B-D would provide more resiliency to local vegetative communities (see silviculture and wildlife understory analysis) and would reduce the risk of habitat loss from severe fire effects (web-based DEIS, page 328). The wildlife analysis found that habitats that include open forest, savanna, and meadow and grassland habitats would remain stable in the long term (web-based DEIS, page 329).
Schoonmaker, Duke	It would be a real shame to loose the magnificent Ponderosa Pine Forest ecosystem of the Arizona Mogollon Rim. Perhaps we will only know in hind sight if this 4-FRI project helped or hurt the longevity of this unique biome	(13-4) Thank you for your comment. Please see the monitoring and adaptive management plan (DEIS, Appendix E) which is designed to monitor movement towards desired conditions and adjust treatments as needed (within the scope of the environmental effects disclosed in the FEIS and decision.
Schoonmaker, Duke	It seems counter productive to try and save the Ponderosa ecosystem by removing a large portion of it. I would hate to think that there might be ANY chance of endangering this natural treasure by thinning and removing a significant portion of its natural population and diminishing it's innate longterm survival.	(13-5) Thank you for your comment. Please see our previous responses to your comments.
Schoonmaker, Duke	Since the US Forest Service has a directive to protect the forest, I would hope they would consider ALL alternatives and possible smaller TEST-PLOT THINNING and observations of "long term" impacts before undertaking such a large scale project and potentially being responsible for the Ponderosa Forest's ultimate demise.	(13-6) Thank you for your comment. Reducing the scope of this analysis would not meet the purpose and need for landscape-scale benefits (web-based DEIS, pp. 7-8 "Background" and pp. 8-9 "Purpose and Need"). However, several alternatives that would have entirely eliminated mechanical treatment or limited the extent of mechanical treatment were considered but eliminated from detailed study (web-based DEIS, pp. 48-54, 58-59). The DEIS (web version) purpose and need for tree density and canopy openness cites a wealth of ponderosa pine-related research conducted from 1911 to 1997. This research provided the current departure from historical reference conditions and was used to determine the need for change in ponderosa pine. Although the number of acres proposed for treatment may seem large, the project proposes a range of treatments that are commonly used in vegetation projects. The cumulative effects analysis (DEIS Appendix F) documents the Forest's familiarity with treating vegetation (including ponderosa pine) and summarizes the outcome (web-based DEIS, page 675-681).

Seals, Joseph	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important	(66-1) Thank you for your comments. Please see the response to letter #19.

	in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Sensibaugh, Mark	Discussion items: Mark could not find the range specialist report in the list of specialist reports in the planning documents, specialist reports section of the FS 4FRI website (see below). I said I'd see if I could find it and call him back once I located it. I was able to find the range specialist report going in to the PALS project documentation. I called Mark back and stepped him through the process of getting to PALS from the FS 4FRI website (under quick links, select 4FRI NEPA Project Tracking (PALS)---document is in the project documents.---see screen capture below)	(2-1) This was a request for general information and the location of the Range Specialist Report. No further further response required.
Shaw, Thelma	As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the	(64-1) Thank you for your comments. Please see the response to letter #19.

	landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change.	
Singh, Gurleen Sanderson Port, Patricia	The Department of the Interior (Department) is providing comments on the U.S. Forest Service's (USFS) Draft Environmental Impact Statement (DEIS) for the Four-Forest Restoration Initiative (4FRI) on the Coconino and Kaibab National Forests (NFs), Arizona. We would like to express our support for this important project and appreciation for your willingness to work with us to incorporate listed and sensitive species' needs into proposed action alternatives. Over the last 8 years, resource management staff within Departmental bureaus have participated in the 4FRI collaborative planning process. The 4FRI would address fire risk reduction and forest health within remaining watershed and view-shed areas.	(175-1) Thank you for your comments and support.
Singh, Gurleen Sanderson Port, Patricia	Mexican Spotted Owl Recovery Plans Overall, the DEIS is inconsistent in how it cites or refers to the original 1995 Mexican Spotted Owl Recovery Plan or the 2012 Revised Recovery Plan for the Mexican Spotted Owl. We recommend the Final EIS and supporting documents clearly articulate which Recovery Plan is being referred to in the text, use the appropriate terminology, and cite it appropriately. We understand the existing Land and Resource Management Plans (Forest Plans) for the Coconino and Kaibab National Forests include standards and guidelines from the 1995 Recovery Plan, and we appreciate efforts to incorporate information from the 2012 Revised Recovery Plan. However, it is unclear how or which guidance is being applied from which Recovery Plan. If there is any technical assistance we can offer you to provide clarity, please	(175-2) The use of the words "Recovery Plan" is defined on page 31 of the wildlife report, according to common scientific literature citation protocol. The revised recovery plan was released after the DEIS was sent into the government printing office and therefore there is no reference to it in the wildlife report. The draft recovery plan was released before we completed the DEIS and it is referenced on page 252 of the wildlife report, but incorrectly cited as 2012 instead of 2011. A crosswalk between the former Recovery Plan, the Revised MSO Recovery Plan has been developed and is appendix 3 of the final wildlife report. A crosswalk to the revised MSO Recovery Plan will be made part of the silviculture report and wildlife report. The FEIS will be updated to discuss the transition to the revised Recovery Plan. Appendix B, forest plan amendment, has been updated to provide a consistency evaluation

	contact the U.S Fish and Wildlife Service (FWS), Flagstaff Ecological Services Field Sub-Office.	for the revised Recovery Plan. The FEIS uses the 2012 Recovery Plan in the implementation plan (Appendix D) for Alternatives C and E to describe the management guidance for these alternatives as well.
Singh, Gurleen Sanderson Port, Patricia	Summary Summary, page iii: In the summary, and throughout the DEIS, the word "mortality" is used improperly. "Mortality" is a rate and" fatality" is the act of dying. For example, third paragraph of the summary section states, "The remaining old pines are at risk of mortality from the increased overcrowding of trees…" The old trees are at risk of fatality from the stated factors. We recommend as the DEIS is edited, the use of these terms be corrected throughout.	(175-3) Thank you for your comment. We looked up the definition in Merriam-Webster online, accessed 10/31/2013: Mortality is: 1) the quality or state of being a person or thing that is alive and therefore certain to die: the quality or state of being mortal; 2) the death of a person, animal, etc.; 3) the number of deaths that occur in a particular time or place. "Mortality" Because it is commonly used in the technical literature it was considered sufficient.
Singh, Gurleen Sanderson Port, Patricia	Major Conclusions, page xi: This section states to varying degrees, all action alternatives (B-D) meet the forest structure and pattern, forest health, and vegetation composition and diversity elements of the purpose and need. However, when reviewing summary data and information provided in Chapter 3 (Affected Environment and Environmental Consequences), it is unclear how Alternatives B and D improve large oaks, compared to Alternative C (eighth bullet, page xi).	(175-4) All action alternatives have the same design feature for improving large oaks, therefore all action alternatives would improve large oaks. Alternative C would do more to improve large oaks because it includes more acres of treatment. The "Major Conclusions" section of the Summary and the Comparison of Alternatives table in the FEIS has been updated to provide clarity.
Singh, Gurleen Sanderson Port, Patricia	Large Gambel oak trees are an important key habitat component in ponderosa pine forests for the threatened Mexican spotted owl (Strix occidentalis lucida), their prey species, and many migratory bird species. Alternative C would be more conducive to maintenance and development of large oaks. We recommend providing more clarity regarding this determination in the Final DEIS.	(175-5) Thank you for the recommendation. The FEIS includes more clarity. Also see our previous response.
Singh, Gurleen Sanderson Port, Patricia	Major Conclusions, page xii: The top of this page states, "All action alternatives provide and sustain long-term Mexican spotted owl nesting and roosting habitat and reduce the risk of high severity wildland fire and other natural disturbances." After reading Chapter 3, it seems that not all action alternatives are equal in this respect. Both Alternatives B and D allow for burning in 72 Mexican spotted owl Protected Activity Centers (PACs), but exclude the nest/roost cores. One of the comments the Mexican Spotted Owl Recovery Team received consistently from USFS fire management staff over the years is it is unrealistic to implement prescribed burns in most PACs, but exclude the core areas. Since neither Alternative B nor D allows for prescribed fire to enter core areas, these important habitats could be at higher risk for high severity wildland fire in the future and may be adversely impacted by efforts to prevent fire from entering core areas through the creation of fire breaks between the adjoining PAC habitat and the core areas. We recommend the USFS continue to work with us to determine what actions will provide the most long-term benefit to the Mexican spotted owl nest/roost core habitat.	
Singh, Gurleen Sanderson Port,	This section also states, "Alternative D (reduced use of prescribed fire) increases forest resiliency to large-scale impacts (including climate) in the short term. In the long term, however, over 300,000 acres would return to pretreatment conditions and would be	(175-7) Alternative D was developed in response to address concerns associated with prescribed fire emissions (DEIS, page 47). We agree that alternative D would not provide the benefits of fire to as many acres, or to the same degree as alternatives B and C. However, it would still lead

Patricia	susceptible to high-severity surface effects, which equates to reduced resiliency to natural disturbance." From this description, Alternative D, which allows for prescribed fire on 178,790 acres (or 414,421 acres less than the Preferred Alternative C), does not meet the purpose and need of the project as described on page iii and in Chapter 1. We recommend providing more clarification in the summary and Chapter 3 discussions of Alternative D to better demonstrate how this alternative will reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity by allowing for the return of fire on only approximately 30 percent of the acres proposed for prescribed burning in Alternatives B and C.	to improvements on the landscape relative to current conditions. In the FEIS, the Major Conclusions section of the Summary and the Comparison of Alternatives section (chapter 2, table 35) have been updated to improve clarity.
Singh, Gurleen Sanderson Port, Patricia	Chapter 1 – Purpose and Need for Action Mexican Spotted Owl Habitat, page 13: The Northern goshawk section on page 12 begins with a summary of the existing acres of habitat in the project area. We recommend this be done for the Mexican spotted owl section as well to improve clarity of the discussion in this section. The habitat acreages are provided in Table 7, but there is no description in the text of the total acres of Mexican spotted owl habitat or definitions of protected, restricted other, and restricted target/threshold habitat.	(175-8) Thank you for the comment. The FEIS will begin with a summary of the existing acres of habitat in the project area for Mexican spotted owl. The wildlife report has been updated (edited) as recommended.
Singh, Gurleen Sanderson Port, Patricia	Final Proposed Action, Amendment 1, page 41: There is a significant typographical error in the second paragraph under this header. The amendment which would allow for designating less than 10 percent of restricted habitat should be for the Kaibab NF, not the Coconino NF.	(175-9) Thank you for noting this. This portion of the amendment (for alternatives B-D) has been removed. There is no need for designating less than 10 percent on the Coconino NF and with the revised Kaibab NF Forest Plan; no amendment is needed for any action alternative. In the FEIS, all amendments (formerly part of the DEIS in appendix B) associated with the Kaibab NF have been removed as a result of having a 2014 revised forest plan. The portion of the amendment that would have allowed for designating less than 10 percent of restricted habitat on the Coconino NF has been removed.
Singh, Gurleen Sanderson Port, Patricia	Final Proposed Action, Amendment 2, page 42: This paragraph is unclear. Is the paragraph stating Amendment 2 would allow for both designating less than 10 percent restricted habitat in pine-oak as target or threshold AND remove language that limits PAC treatments in the recovery unit to 10 percent? In addition, though the current Forest Plan incorporates the 1995 Recovery Plan language regarding treating only 10 percent of the PACs within a Recovery Unit and then	(175-10) Thank you for your comment. This paragraph states that less than 10 percent restricted habitat would be designated in this alternative (with the amendment). The reference to treating PACs in the recovery unit in increments of 10 percent comes from the former Kaibab Land and Resource Management Plan (USDA 1988) on page 24. In February of 2014 the record of decision for the Kaibab NF Land and Resource Management Plan was signed. For the Kaibab NF portion of

	evaluating those treatment effects before treating additional acres, this language does not discuss treating in "increments of 10 percent." We recommend clarifying the description of this amendment so it is clear to the reader what this amendment is modifying in the Kaibab NF Plan.	this decision, no plan amendment would be required as alternative B-D were designed to be in alignment with the new Plan's objectives, desired conditions, standards and guidelines.
Singh, Gurleen Sanderson Port, Patricia	Chapter 2 – Alternatives Incorporate the Original Large Tree Retention Strategy (LTRS), pages 56-58: All though this section is designed to articulate to the public why the LTRS was not an alternative analyzed in detail, it neglects to provide information indicating how the USFS intends to protect large trees. We recommend providing examples from proposed Mexican spotted owl and northern goshawk habitat management (included in all action alternatives to some degree) that will work to maintain and protect large, old trees throughout the project area. This section focuses on all of the reasons why the USFS may need to cut large trees, but does not describe how the alternatives analyzed in detail provide for large tree protection. This comment also applies to the following section regarding limiting mechanical treatments to 16-inch diameter-at-breast height (dbh) trees as a means to preserve large trees. This information could be included by reference with a single sentence added to each section that references later sections in the DEIS. Although we understand the need to keep these sections brief and to the point regarding why these alternatives were not analyzed in detail, we believe it would support the argument to include a short statement indicating that removal of large, old trees would still be the exception and not the common practice of any of the action alternatives.	
Singh, Gurleen Sanderson Port, Patricia	Alternative B – Proposed Action, page 63: This section lists several bullets describing the alternative (e.g., number of acres to be thinned and burned, number of acres to be burned only, etc.). This format is repeated for Alternatives C (page 80) and D (page 87). We recommend after each bullet, the Final DEIS provide where the appropriate documentation or data can be found for each of these alternative components. For example, the bullet "Utilize prescribed fire only on approximately 199,435 acres" would be followed by where in the document, website, or other location the information regarding that component could be found. This would assist the public in finding the information needed to understand each of these alternatives and provide for better communication.	(175-12) Thank you for your comment. The purpose of the bullets is to summarize the actions associated with each alternative and is consistent with providing information in a concise manner. The document, in pdf format, is searchable and chapter 2 of the FEIS provides a summary table of environmental consequences for those interested in following the metrics by resource.
Singh, Gurleen Sanderson Port, Patricia	Alternative B Tables and Figures, Table 17, page 70: The treatment description/objective for Mexican spotted owl threshold and target habitat are listed as being the same treatment in this table (this is also true in Tables 24 and 27 for Alternatives C and D, respectively). Threshold habitat is habitat coming close to providing replacement nest/roost habitat for Mexican spotted owls. Though treatments can occur in threshold habitat, it is important key habitat components not be reduced beyond specified points. However, target habitat is habitat on a trajectory to becoming threshold habitat, but may need more active management to develop the habitat components of	(175-13) The treatment design is the same for target and threshold habitat. We understand that each habitat designation has its own definition (see page 182 of the DEIS for a general definition and pages 352 and 353 of the glossary for full definitions). The same treatment is applied to both habitats, but the intensity of the treatment would vary based on existing conditions. Treatments in target and threshold habitat were designed to maintain elements of MSO habitat where they exist and move forests towards those habitat features where they are lacking (page 161 in the DEIS). More detail can found in the silviculture specialist report. As recommended, additional clarity will be inserted

	nest/roost habitat. Therefore, habitat identified as threshold should not have the same treatment description/objective as target habitat. We recommend providing additional clarity in the biological assessment regarding treatment descriptions and objectives for Mexican spotted owl target and threshold habitats.	into the biological assessment.
Singh, Gurleen Sanderson Port, Patricia	Amendment Descriptions for Alternatives B, C, and D (pages 64, 80-81, 87-88): We recommend including information regarding the benefit to the Mexican spotted owl from including the proposed amendments. Currently, these sections clearly articulate how the Forest will not be following the existing forest plans, but do not describe how the use of the amendments could benefit Mexican spotted owl habitat. There may be less confusion regarding the public's acceptance of these amendments if their habitat management needs were articulated as well. For example, for Alternative C, Amendment 1 (page 80), the initial cause for and amendment could be modified to state (italicized text is our addition): "Amendment 1 would allow mechanical treatments up to 18-inches dbh in order to improve habitat structure by promoting large tree growth, creating small openings to increase prey habitat diversity, and other site- specific goals in 18 Mexican spotted owl PACs. Large trees in owl PACs would not be targeted for removal, but would be removed as indicated to meet habitat and fuels protection objectives." Adding additional explanation clarifies the need and justification for the amendment and should be provided for each of the amendment descriptions.	
Singh, Gurleen Sanderson Port, Patricia	Tables 21 (page 76), 26 (page 85), and 29 (page 92): We recommend providing clarification as to whether the "Protected Habitat (Acres)" listed in these tables include only PAC acres or if it also includes protected steep-slope habitat. If the acreage includes both PACs and steep-slope habitat, we recommend splitting these out for ease of analysis in the biological assessment.	(175-15) Thank you for your comment. Acres are reported more clearly in the FEIS final wildlife report. In the FEIS, footnotes have been added to the MSO summary of treatment tables (tables 27, 32, 35 and 38).
Singh, Gurleen Sanderson Port, Patricia	Soils and Watershed, Forest Plan Amendments, Alternative B and D, Coconino NF, Amendment 1 (page 117): This paragraph states Amendment 1 would result in the removal of more trees in 18 Mexican spotted owl PACs since trees up to 16 inches dbh could be removed. The paragraph then goes on to describe removal of additional trees would improve vegetative ground cover. However, we question whether this would result in more trees being removed versus different trees being removed. The point of increasing the diameter cap is not necessarily to remove more trees (though that may occur), but to improve our ability to implement uneven-aged management. We recommend this analysis should focus more on the desired conditions in PACs (see Revised Recovery Plan, Appendix C, pages 275-277) and less on the number of trees to be removed. We recommend focusing the discussion of effects on how increasing the diameter cap better allows us to meet the desired conditions for owl nest/roost habitat (uneven sized/aged groups, multistory canopy), versus merely removing more trees. This comment also applies to	(175-16) Thank you for your comment. The FEIS includes additional comparison between alternatives for effects to Mexican spotted owl (FEIS, chapter 2).

Singh, Gurleen Sanderson Port, Patricia	the analysis for the increased diameter cap of 18 inches dbh for mechanical removal of trees in Alternative C. Soils and Watershed, Forest Plan Amendments, Alternative C, Coconino NF, Amendment 1 (page 118): We recommend including language discussing how there may be adverse effects to PACs from attempting to keep prescribed fire out of nest cores while burning the rest of the PAC. This section describes the benefits of introducing low intensity prescribed fire, but should also include what management actions would need to be implemented (e.g., creation of fire line, cutting of snags) to preclude fire from these areas. We also recommend stating there would likely be additional acreage within the PAC that would not be burned in order to keep fire from the nest core, so these areas would continue to be at risk from high-severity fire.	(175-17) Thank you for your comment. Additional details were added to the wildlife report and FEIS.
Singh, Gurleen Sanderson Port, Patricia	Vegetation, Kaibab NF, Amendment 2 in alternatives B and D (page 144) and Amendment 3 in alternative C (page 145): This section states if this amendment did not occur, treatments within Mexican spotted owl habitat would continue to meet the intent of the Mexican spotted owl Recovery Plan. We respectfully disagree with these statements as meeting the intent of both the original 1995 and 2012 Recovery Plans. Though there were specific recommendations to not cut above 9 inches dbh in PACs in the 1995 Recovery Plan, this was included as a protective measure until more could be learned about thinning and burning within PACs. The overall intent of both plans is to implement actions that maintain and/or enhance owl nesting and roosting habitat while monitoring to learn from these actions. If these amendments are not included and we are unable to use uneven-aged management to remove trees in PACs and increase the resiliency and sustainability of these areas, while monitoring the effects of our actions on owls, we will not meet the intent of the Recovery Plan. We recommend the USFS consider modifying this language throughout the DEIS to better articulate what will happen without the amendments. Our interpretation is that limited thinning would occur within these PACs (up to 9 inches dbh) that would remove some ladder fuels, but would not allow for release of overtopped Gambel oak, would not allow for creating small openings to increase prey habitat diversity, and would likely not allow us to	(175-18) While we agree on nearly all the comments made and appreciate your interest, moving forward without the amendment could still improve Mexican spotted owl habitat. While following the direction from the 1995 recovery plan would resulting considerably reduced and shorter lived benefits to Mexican spotted owl and would not develop information on managing owl habitat, it was the only official recovery plan in existence when the DEIS was being written. We agree that this limited benefit would be at the cost of not achieving much greater short- and long-term benefits for Mexican spotted owls. Nevertheless, achieving a limited benefit to owls is still benefit. In response to comments on the DEIS, alternative E was developed. Alternative E provides a sharp point of comparison because it includes no forest plan amendments for the Coconino NF. The wildlife specialist report evaluates alternative E and the FEIS provides a summary of effects (chapter 2) that should highlight the effects of not meeting the intent of the 2012 Recovery Plan.

	learn how to treat these areas to maintain Mexican spotted owl occupancy and reproduction.	
Singh, Gurleen Sanderson Port, Patricia	Table 65, Threatened, endangered, candidate, and sensitive species evaluated in this analysis (page 175): We recommend including in the “Status” column of this table: “the bald eagle (Haliaeetus leucocephalus) is also protected under the Bald and Golden Eagle Protection Act (BGEPA).” In addition, the golden eagle (Aquila chrysaetos) is also a federally-protected species under the BGEPA, and should be included in this table. The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. BGEPA provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb" means: “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human- induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.	(175-19) Thank you for your comment. This information is reported on page 126 of the wildlife report under the header “Bald and Golden Eagle Protection Act (Eagle Act).” The FEIS, biological assessment and final wildlife specialist report will be edited to provide better clarity on the status of the bald eagle.
Singh, Gurleen Sanderson Port, Patricia	Mexican spotted owl, Summary of Habitat Conditions (pages 179-180): Though we agree many Mexican spotted owl habitats are at risk from stand density-related mortality, we recommend more detail regarding the current stand conditions be included. Owls currently reproduce successfully across the project area; if all Mexican spotted owl habitats were in a non-functioning condition,	(175-20) We do not believe we have confused forest health conditions with MSO biology. No reference was made to owl survival and reproduction. The discussion was specifically addressing the current trajectory of these forest stands. The wildlife report prepared for the DEIS provides detail on pages 56-54, with particular detail in tables 4 and 5. In the DEIS, table 7 provided a summary of existing and desired

	this would not be the case. Though there is much opportunity to improve the resiliency and sustainability of these habitats, we would expect to maintain patches of habitat that continue to be denser than the majority of the landscape in order to provide the canopy cover and other habitat conditions typical of nest/roost locations. In addition, we recommend including a citation for the statement, "There is decreased quality in prey habitat due in part to uncharacteristic canopy connectivity from in-growth of smaller trees inhibiting herbaceous understory development."	habitat conditions. The silviculture report provided more detail on existing conditions within MSO habitat than what was summarized in the FEIS, specifically on pages 36-37. ""> on how stand structure affected fire risk in MSO habitat (see pp. 28-38, 53-74,). Combined, the specialists highlight the status of risk and resiliency to existing MSO habitat, although none of the analyses state the habitat is "non-functioning." Similarly, the current and future status of habitat health is a separate concern from past MSO reproductive success. The FEIS includes additional clarity and comparison between alternatives for effects to MSO habitat (see FEIS, chapter 2). The metrics used to display changes in stand conditions in MSO habitat at the landscape scale include spatial arrangement (percent/acres with relative ability to attain and maintain mosaic of interspace) and percent openness (heterogeneity). Within the 18 MSO PACs proposed for mechanical treatment (and prescribed fire in alternative C), the metrics used to display changes in stand structure include basal area, stand density index, trees in the 12 to 17.9 inch d.bh. category, trees in the 18 inch to 23.9 inch category, trees in the 24 inch plus category, and percent of active crown fire risk/potential. We believe these disclosures address your comments.
Singh, Gurleen Sanderson Port, Patricia	Alternatives B, C, and D – Direct and Indirect Effects (page 181) and Springs, Ephemeral Channels, Meadows, and Aspen (page 186): Please include in the analysis of effects, the effect of constructing fence within PACs to protect aspen. We would like to see the amount of proposed fencing to be constructed and what materials will be used included in the description of potential effects from the aspen treatments. Forest Structure in PACs (page 181): For the Final DEIS, we recommend removing all references to the "draft recovery plan." The Final Revised Recovery Plan for the Mexican Spotted Owl was issued in December 2012 and is no longer a draft document.	(175-21) Total fencing can be estimated across the entire implementation area in an adequate manner, but estimates that only address aspen projects within PACs is more difficult. The more detailed the view, the more site variability becomes a factor. Treatment placement, use of natural features, access, and cost of fencing are all factors that would affect the answer to the information request, as is whether every aspen clone will be treated given all of the above. Field visits to PACs indicate some clones may not require fencing due to natural features or only require fencing along a portion of the perimeter. The DEIS does state that no new wire fencing would be constructed in PACs (DEIS, Appendix C, W20, page 594). Other alternatives would be used for aspen, seep, spring, and ephemeral drainage restoration exclosures (DEIS page 594 and wildlife report pages 163and 200). Fencing alternatives would be coordinated with other specialists. If suitable alternatives for fence design and placement cannot be identified, restoration work would not occur (Appendix C, page 594 of the DEIS). The FS has stated that fence design in PACs

		would be coordinated with the FWS. Other design features developed to address fencing include W42, W43, W45, and W47 (DEIS, page 598). Because design features developed for the 4FRI were a result of the draft recovery plan, references to draft have to remain. We will work to make references to the 1995 plan, the draft plan, and the revised plan clearer in the FEIS, but unfortunately the timing of this project and the timing of the recovery plan revision did not result in making 4FRI project planning easier.
Singh, Gurleen Sanderson Port, Patricia	Disturbance (page 184): We recommend including more information regarding hauling and potential effects to Mexican spotted owls. It is our understanding that hauling could occur at any hour, including the middle of the night in the early breeding season (March – April) in order for trucks to operate on frozen ground. In addition, it is possible over the life of this project (10 to 15 years) that with all of the additional trucks moving through Mexican spotted owl habitat at all hours of the day and night, it is possible owl could be struck by a truck. This possibility should be disclosed in the effects section. This section states, "Core areas would be protected from prescribed fire by using roads, natural barriers, or new fire line to contain burn units. Building line would occur outside the nesting season." Fire line construction in PACs frequently results in the loss of key habitat components (snags, large logs). Fire lines can also turn into social trails used by motorized vehicles. We recommend including information regarding these potential effects of eliminating low intensity prescribed fire from all nest cores.	(175-22) We agree. This analysis will be expanded and more time will be spent considering the impacts from traffic. A more robust analysis will be in the final wildlife report and FEIS. See our earlier response regarding fireline construction.
Singh, Gurleen Sanderson Port, Patricia	Table 70 and Table 71, Northern leopard frog (pages 194-195, 201): We appreciate you working with us and the Arizona Game and Fish Department to develop and include protective measures for the northern leopard frog (Lithobates pipiens) as a part of this project. Your continued efforts to assist with the conservation of this imperiled species are appreciated.	(175-23) Thank you for your comment.
Singh, Gurleen Sanderson Port, Patricia	Table 71, Bald Eagle (page 202): The effects analysis for the bald eagle should include a determination of whether or not take will be avoided (and how) per the BGEPA. In addition, we recommend the analysis of effects include the definition of disturbance from the BGEPA (included in our comments above). The description of effects in this table indicates there could be disturbance of eagles, which	(175-24) This information was reported in the wildlife specialist report in the "Determination of Effects for all Alternatives" in the Bald and Golden Eagle Protection Act section for Environmental Consequences (page 409) in the DEIS and will be brought forward into the FEIS.

	would be considered take under the BGEPA. We will continue to provide technical assistance in regards to the effects analysis and work with you to develop conservation measures to reduce and/or remove adverse effects from the proposed action.	
Singh, Gurleen Sanderson Port, Patricia	Table 71, Narrow-headed gartersnake (page 211): In the description of environmental consequences for the gartersnake, spring restoration is noted as providing beneficial effects for the species. Which springs has the Forest identified for restoration to improve habitat for the narrow-headed gartersnake?	(175-25) Thank you for your comment. In response to this comment it was determined that the springs proposed for restoration are not directly connected hydrologic ally to narrow-headed garter snake habitat. The description will be adjusted in the FEIS and updated in the aquatics specialist report.
Singh, Gurleen Sanderson Port, Patricia	Northern Goshawk, Environmental Consequences, Other Activities (page 222): This section states that Mexican spotted owl habitat supports lower densities of rodent prey species than would habitat treated to meet goshawk habitat direction in the forest plan. Please provide information in the DEIS to support this statement. Though we agree that providing habitat for a generalist species, such as the northern goshawk, across a large landscape would likely provide for higher densities of some prey species, we disagree that Mexican spotted owl nest/roost, foraging, and dispersal habitat does not also provide habitat for a variety of prey species. In addition, habitat management recommendations in the Revised Recovery Plan for the Mexican Spotted Owl should result in increased prey species diversity and densities across large areas as well (FWS 2012).	(175-26) Thank you for your comment. The wording will be adjusted. Nowhere in the DEIS does it say that Mexican spotted owl habitat "does not provide for a variety of prey species." It does say that Mexican spotted owl habitat likely supports lower densities of prey species relative to goshawk habitat outside of Mexican spotted owl habitat. That is based on canopy cover and forest density direction for managing owl habitat. Forest canopy openings support more herbaceous growth than more closed canopies or more contiguous closed canopies (see appendix 8 of the draft wildlife report for overstory/understory relationships and prey species responses). We expect treatments would increase understory response and benefit prey habitat as described on page 183 of the DEIS and this conclusion is supported in the literature. The relatively denser canopy conditions prescribed for Mexican spotted owl habitat would limit understory production and hence support lower densities of rodents and many song birds.
Singh, Gurleen Sanderson Port, Patricia	Other Protected Species, Golden Eagle (page 222): Because the golden eagle is protected by the BGEPA, we recommend moving the information and discussion regarding the golden eagle up to the section that includes federally-protected species, and so that it is presented closer to the discussion regarding the bald eagle.	(175-27) Thank you for your comment. This discussion will be moved to improve document organization.
Singh, Gurleen Sanderson Port, Patricia	Appendix D – Alternatives B Through D Implementation Plan, Section A – Management Direction, Desired Conditions, and Treatment Design, MSO Habitat (pages 610-617): We are available to work with the USFS staff to refine the implementation plan for the Mexican spotted owl and its habitat. We recommend planning an upcoming meeting to refine this guide in order to meet our mutual project tracking needs.	(175-28) Thank you. We look forward to working on appendix D with you.
Singh,	Appendix E – Alternatives B Through D Monitoring and Adaptive	(175-29) We agree. Mexican spotted owl monitoring direction resulting

Gurleen Sanderson Port, Patricia	Management Plan (pages 659- 674): There will be monitoring conducted to evaluate the effects of the proposed treatments on Mexican spotted owls that has yet to be defined, but will be included in the biological opinion for this project. When completed, we would like to see the monitoring plan adopted into the Adaptive Management Plan.	from consultation will be incorporated into the FEIS appendix E, monitoring and adaptive management plan.
Singh, Gurleen Sanderson Port, Patricia	Appendix G – Bridge Habitat, MSO Protected, target/threshold, and restricted habitats (page 703): This section states, "Protected habitat is generally densely forested, target/threshold habitat is similar to protected habitat, and restricted habitat is slightly less dense than protected but still more densely forested relative to the surrounding treated areas outside of Mexican spotted owl designations." Tree density is not a key habitat component of Mexican spotted owl habitat. If we are trying to convey nesting/roosting habitat within protected activity centers and replacement nest/roost habitat patches (i.e., target/threshold habitat) provides higher canopy cover, more large trees, and tends to be more decadent than random or other patches of habitat, we would concur. However, we do not believe tree density is a measure of owl habitat. In addition, other restricted habitat (not identified as target/threshold) is treated to varying degrees as described in the DEIS, but our understanding is that it will be relatively open (70 to 90 square feet per acre basal area). We recommend re-wording this initial description to reflect the relatively more closed-canopy condition it will provide versus describing it as "dense."	(175-30) We agree that density is not a key habitat component or a primary constituent element of MSO habitat. 1995 recovery plan used density by size-class as a measure, but not density alone. As you point out, the referenced discussion is in a section focused on closed canopy habitat, not on spotted owls per se. Although density is not a key habitat component of Mexican spotted owl habitat, meeting the key habitat components results in dense forests (see "Tree Density" in the Affected Environment section of the wildlife report or discussions of percent maximum SDI in the alternative analyses; it is also discussed in the silviculture report). Current and future nesting and roosting habitat typically measures in the "Extremely high density" zone associated with full site occupancy, severe competition, and minimum tree growth (see Long 1985 or the specialist reports already cited). The bridge habitat appendix is a discussion of post-treatment canopy conditions. Forested areas such as current and future nesting and roosting habitat have inherent management guidelines that result in dense stand conditions and will contribute to bridge habitat as described in the DEIS (and FEIS) appendix G.
Singh, Gurleen Sanderson Port, Patricia	Appendix G – Bridge Habitat, Implementation guide – MSO guidance (page 709): We recommend these guidelines be modified to reflect the proposed alternatives. For example, the first bullet states, "Each PAC has a 100-acre, no treatment area around the known nest or roost site." Depending upon which alternative is implemented this may or may not be true. In Alternative C, some nest cores may be mechanically treated and burned. We encourage the USFS to clearly state this in the appendix to be clear to the reader what design feature will be implemented under each alternative.	(175-31) Thank you for the thorough review. We agree and will revise the wording in the final wildlife report. Please note, however, that none of the alternatives propose mechanical treatments in core areas.
Singh, Gurleen Sanderson	We appreciate the opportunity to review 4FRI DEIS. The Department agrees with the USFS that moving forward with the 4FRI project is vital to landscape restoration, wildfire risk reduction,	(175-32) Thank you for collaborating with us on treatment design and implementation. We agree that implementation could increase habitat resiliency.

Port, Patricia	wildlife habitat management, watershed function, and scenic quality and visitor retention with the project area. The Arizona Ecological Services Field Sub-Office is available to discuss these comments with the USFS. If you have any questions or need additional information, please contact Steve Spangle, Supervisor, Arizona Ecological Services Field Office, Phoenix, Arizona, at 602-242- 0210, or Paul Whitefield, Natural Resource Specialist, Flagstaff Area Monuments, Flagstaff, Arizona, at 928-526-1157 extension 235.	
Smallwood, Tracey	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected,	(152-1) Thank you for your comments. Please see our response to letter 19.

	with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Smaluk-Nix, Kathleen	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are	Thank you for your comment. Please see our response to Letter #19.

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Smaluk-Nix, Kathleen	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should	Thank you for your comment. Please see our response to Letter #19.

provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

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(195-1) Thank you for your comment and interest in the 4FRI. Please see the response to letter #19.

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	15, 2013 from 1:00 p.m. to 4:00 p.m. at the Coconino NF Supervisor's Office, 1824 S. Thompson Street, Flagstaff, Arizona 86001, we would love to see you there if you can make it.	
Smith, Rocky	Thanks very much for your quick response. I am easily able to download the reports I seek.	(188-1) No further response required. Assistance was provided as requested.
Souza, Caylie	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all	(48-1) Thank you for your comments. Please see our response to letter #19.

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Springer, Abraham	We greatly appreciate all of the time and effort the 4FRI Team members have spent preparing the Draft Environmental Impact Statement for the Four Forest Restoration Initiative (DEIS) and welcome the opportunity to provide you with these comments. The following comments are primarily focused on DEIS wording related to the paired watershed study and other watershed-related topics. This letter is in two parts. Part 1 addresses concerns related to the proposed paired watershed study and includes specific recommendations. Part 2 addresses other watershed-related topics and mainly provides edits and points for clarification. Where there are concerns in part 2, recommendations are made. Thank you for your consideration of these comments. Please, contact Sharon Masek Lopez at 523-8902 or sharon.masek_lopez@nau.edu if you have questions or wish to discuss any of our comments.	(162-1) Thank you for your time and input.
Springer, Abraham	Part 1. The proposed paired watershed study Concern 1: The description of the paired watershed study needs to be broader or more accurate to allow for the various proposed research activities. DEIS Discussion: In multiple places in the document, including pages 81, 292, and 309, the DEIS mentions that Alternative C will add construction of “up to 15 weirs and 20 weather stations (up to 3 total acres of disturbance) to support watershed research.” This wording could be more generalized to encompass all the proposed research activities of the paired watershed study. There are currently 12 watersheds proposed for inclusion in the study. Weirs and weather stations are only two types of instruments that would be installed. We would also install and maintain the following types of equipment: ? 6 eddy covariance flux towers, NAU SESES comments, 4FRI DEIS Page 2 of 11 ? Numerous (>36) sapflux sensors, ? 12 rain gauges (in	(162-2) Thank you for your comment. The wording for the water yield research has been updated and additional information has been included in the alternative description.

addition to those that are part of the weather stations), ? Time-lapse cameras, ? 12 snow pillows, ? >36 TDR soil moisture probes, ? 12 COSMOS soil moisture sensors, ? 12 water autosamplers, ? 12 in situ turbidimeters, ? a yet-to-be-determined number of hillslope and channel sediment traps, ? a yet-to-be-determined number of markers for snow courses, and ? a yet-to-be-determined number of pins for relocating vegetation plots. Recommendation: Conduct a word search in the document for the words "construct [or construction of] up to 15 weirs and 20 weather stations …" and change the wording to read something like this: "Install and maintain scientific instruments, weirs, flumes, sediment traps and survey courses in up to 12 watersheds (up to 3 total acres of disturbance) to support watershed research and provide forest management tools to managers to protect watershed health."

Springer, Abraham

Concern 2: A more complete description of how the paired watershed study affects treatments is needed, including addressing the need for true controls. DEIS discussion: On page 270, under the header "Alternative C", there is an incomplete description of how the paired watershed study would affect the environment. There are numerous ways in which the study could change the restoration activities, including: 1. Treatment would be delayed 7 years to allow for a data collection during a calibration period, 2. Roads that have been selected for closure under Travel Management Rule would remain open (to researchers) to access instruments efficiently, 3. After initial treatment and burning, follow-up burns are anticipated at 7-year intervals to determine the efficacy of frequent fire for reducing evapotranspiration and promoting water balance more conducive to forest resilience. Follow-up burning has not been addressed in the DEIS, 4. Independent Forest Service researchers and Salt River Project reviewers of the paired watershed study plan have strongly recommended that the Forest Service allow the control watersheds to be completely untreated (ie. rather than "minimally treated" with mostly burn only and some limited mechanical treatments) for the study to operate properly and to have robust comparison between treated and untreated conditions. Comments by reviewers include the following: Dan Neary, RMRS – The word "minimal" [burn only] for "control" is debatable. The reference

(162-3) In the FEIS control watersheds would remain untreated as recommended. Roads that remain open for administrative use would be available for access to research sites for the duration of the study. Page vi, 2nd bullet of the EIS Summary states "On those acres proposed for prescribed fire, two fires would be conducted over the 10-year period." The paired watershed study is not expected to affect follow-up prescribed fire treatments. Prescribed burning treatments would require implementation protection measures (i.e., removal) for research instrumentation. Treatments in experimental watersheds would be deferred during the 7-year calibration period. The fire ecology report addresses the effects of the watershed research to fire. Under alternatives C and E, fire behavior would be affected as follows in restoration units 1 and 3. In alternative C, RU 1, "A 498 acre control watershed for a research project would not receive any treatment. It would account for 2 percent (200 acres) of all crown fire in RU1; 3 percent (acres) of the active crown fire in RU1. Subunit 1-3 would have a 498 acre control watershed which, for research purposes, would receive no treatment. It would account for 9 percent (200 acres) of all crown fire in this SU1-3; 12 percent (176 acres) of the active crown fire in subunit 1-3. In RU 3, two control watersheds for research purposes would receive no treatment. They would account for 9 percent (835 acres) of all crown fire in RU3; 31 percent (686 acres) of the active crown fire." "There is one watershed in each of SUs 3-2 and 3-3 that

condition should be the current untreated condition. … This gets to the heart of the argument about what constitutes a "control". Again, the real control is the current condition. If you allow a prescribed fire then you might have a surprise and lose more than 30%. That would definitely affect interpretation of results. If the 4FRI Team is interested in the results of this study and their efforts then they should allow the controls to be left undisturbed. You are only talking about 2,700 ac out of 593,000 ac. … The controls [need to be] kept in an "untreated condition"... or you lose the power of providing "insight into the effects of forest restoration." Pete Wolgemuth, PSWRS - Without controls there is no paired watershed experiment. Yet you have multiple controls, and this is necessary for watersheds in different (albeit similar) geographic areas. The problem is that the controls will have a prescribed fire treatment applied to them after the calibration period. It is stated several times that there should be little effect of prescribed fire on water yield as there will be less than 30% change in basal area across the watershed. So, are there no other fire effects in this ecosystem that influence the overall water balance? If so, what are they and why don't we worry about them. If not, you need more references to support this contention. Alternatively, you could try to work with the Forest Service to leave your control watersheds unburned. Or leave some other watersheds unburned that you could also instrument. Barring this, you're pretty much stuck. Just forge ahead, tell it like it is, and know that there will be some extra uncertainty in trying to tease out treatment effects. Mark Hubbel and Tim Skarupa, SRP - You must have a control watershed or you cannot really identify treatment signals from general noise. As currently planned] there is not going to be a real control for this study. When a true control is necessary, how can this work? Seems that without a true control we are adding unnecessary noise to a relationship that may not be able to be overcome. Recommendations: 1. Insert discussion of how the watershed study affects treatments, including the following: a. no treatment of the three control watersheds, b. continued road access (by researchers) for the duration of the study, c. follow-up burn treatments on experimental watersheds, and d. deferring treatment during the 7-year calibration period. 2. Change the prescriptions for the control would function as a 'control' watershed for research. No treatments would occur in either of these. In SU3-2, the control would account for 34 percent (408 acres) of the crown fire, of which 356 acres would be active crown fire. In SU3-3, the control would account for 14 percent (427 acres) of the crown fire, of which 330 acres would be active crown fire." In alternative E RU1, "A 498 acre control watershed for a research project would receive no treatment. This watershed would account for 8 percent (1,043 acres) of the crown fire, of which 874 acres would be active crown fire." "Subunit 1-3 would have a 2,291 acre control watershed which, for research purposes, would receive no treatment. It would account for 36 percent of the crown fire in this subunit (1,043 acres). It is about three miles down the drainage to Upper Lake Mary, though the majority of the area is less than a 5 percent slope, and all is less than 10."In RU3, "Two control watersheds for research purposes would receive no treatment. They would account for 9 percent (838 acres) of all crown fire in RU3; 28% (694 acres) would be active crown fire." "There is one watershed in each of SUs 3-2 and 3-3 that would function as a 'control' watershed for research. No treatments would occur in either of these. In SU3-2, the control would account for 32 percent (411 acres) of the crown fire, of which 359 acres would be active crown fire. In SU3-3, the control would account for 15 percent (427 acres) of the crown fire, of which 334 acres would be active crown fire. "Overall crown fire potential would be increased by 2,310 acres in the control watersheds. Surface fuel loading would remain higher as well, with the associated increased potential for high severity effects from increased fire intensity.

Springer, Abraham	watersheds from burn only and minimal mechanical treatment to "no treatment". Concern 3: ERI and SRP desire to test hydrologic and ecologic effects of evidence-based restoration treatments at the watershed scale. DEIS Discussion: While the 4FRI project does have some evidence-based treatments planned (such as savanna treatments), most of the higher-intensity treatments do not utilize the evidence- based approach. Nowhere in the first analysis area is there a watershed with an extensive enough area of evidence-based treatment to research watershed-scale effects of this treatment type. The Ecological Restoration Institute and the Salt River Project desire to test evidence-based restoration treatments at the watershed scale on 3 watersheds that already have mostly moderate to high-intensity treatments planned. These include watershed MS-3 in the Middle Sycamore set of watersheds and LM-3L and LM-4 in the Lake Mary set of watersheds. LM-3L, which is largely planned as a savanna treatment, is already mostly evidence-based. Recommendations: 1. Amend treatment prescriptions for watershed MS-3, LM-3L and LM-4 to evidence-based restoration from the current proposed treatment. Work with ERI to define the methods of evidence-based treatment for these watersheds. 2. On page 47 – Alternative development process – please add that, besides eliminating mechanical thinning and burning in control watersheds, the watershed research will change the treatment prescription on approximately 2,700 acres to evidence-based restoration.	(162-4) The treatments proposed within the watershed study areas can all be implemented with an evidence-based restoration as long as the replacement ratio meets the objectives of the proposed treatment. Each treatment type states concerning groups size the following: Overall, average group size would vary within this range depending on site quality, existing stand structure, and pre-settlement tree evidence. (DEIS 616,619, 622, 624, 629, 632, and 634).
Springer, Abraham	Concern 4: Clarification is needed on statement about weather station location. DEIS discussion: On page 309, it is not clear what is meant by immediate foreground in the sentence, "A weather station located outside of the immediate foreground (300 feet)". Is this in reference to distance from roads, trails, camping areas, etc? The eddy covariance towers will be much larger than the weather stations. We will try to place them in discrete locations. They will lie within a 200-meter radius circle of relatively flat ground where tree cover is fairly continuous and consistent with the watershed and treatment as a whole. Recommendation: Please clarify what is meant by "A weather station located outside of the immediate foreground (300 feet)".	(162-5) Sites, travel ways, special places, and other areas are assigned a Concern Level value of 1, 2, or 3 to reflect the relative High, Medium, or Low importance of aesthetics. Seen Areas and Distance Zones are mapped from these 1, 2, or 3 areas to determine the relative sensitivity of scenes based on their distance from an observer; these zones are identified as foreground (up to 1/2 mile from the viewer), middleground (up to 4 miles from the foreground), and background (4 miles from the viewer to the horizon). Reference: Landscape Aesthetics A Handbook for Scenery Management. Agriculture Handbook 701.

Springer, Abraham	Concern 5: The originally identified control watershed LM-1 on Mormon Mountain will now be treated as part of the Flagstaff Watershed Protection Project, rather than under 4FRI, eliminating it as a control for the paired watershed study and necessitating the selection of another control watershed. DEIS discussion: Watershed LM-1 was analyzed under 4FRI for limited mechanical treatments and burn only treatments. Because this area will be managed under another project now (FWPP), another control must be selected and analyzed. Four potential control watersheds have been identified (figure 1). Characteristics considered in selecting these potential controls include the following: 1. Topography and geology consistent with neighboring experimental watersheds (all), 2. Size comparable to neighboring experimental watersheds (most are smaller than ideal, but would work), 3. Road access (most are comparable, with some preference for more proximal watersheds), 4. Low intensity of original treatment prescription, so that "no treatment" is not a big departure (LM-1D does not fit this; the other 3 should be compared further), 5. Preference for watersheds with lower tree density, so long-term fire hazard will be less (LM-1D does not fit this; the other 3 should be compared further), and 6. Availability of a suitable site for an eddy covariance (EC) flux tower (as described in Concern 4 discussion above). The EC flux tower potential of Lake Mary control watershed options is as follows: LM-1A – fair (flat spot has trees denser than overall, ie. not representative) LM-1B – poor (not flat enough) LM-1C – good (tree density representative, flatness fair) LM-1D – fair (flat, but band of meadow along one side of effective area) Recommendation: The 4FRI Team should work collaborative with NAU, ERI, and SRP to select and reanalyze a control watershed for the Lake Mary set of watersheds. NAU's preferences from highest to lowest are LM-1C, LM-1A, LM-1D and LM-1B.	(162-6) From DEIS to FEIS, a new control watershed for the Lake Mary set of watersheds was selected collaboratively with NAU, ERI, and SRP and analyzed in the FEIS. This was completed as a result of having the Flagstaff Watershed Protection Project proposed actions.
Springer, Abraham	Other comments regarding the proposed paired watershed study One minor edit could be made on page 262. The phrase "and wildlife and watershed research and restoration" should probably read, "and wildlife and watershed research on restoration" (emphasis added).	(162-7) This recommendation will be incorporated into the FEIS.
Springer, Abraham	It may be prudent at some point to consider alternative suitable locations for experimental watersheds, in the event that, through the EIS review process, there emerge concerns about these currently	(162-8) At this point in the analysis process, it is not reasonable to consider alternative suitable locations. Since the DEIS was issued, the environmental consequences have evaluated how the proposed

	proposed experimental watershed sites interfering with the protection or promotion of other resource values. Is there a collaborative process by which alternative sites could be evaluated, if need be?	experimental watershed sites affect meeting the purpose and need for the project (desired conditions).
Springer, Abraham	Part 2. Other watershed-related topics Below are questions, observations and comments made on watershed-related topics throughout the DEIS. Questions regarding forest plan amendments: 1. What is the difference between a significant and a non-significant forest plan amendment? Please, clarify.	(162-9) Forest Service Handbook 1926.51 stated, “Changes to the land management plan that are not significant can result from: 1. Actions that do not significantly alter the multiple-use goals and objectives for long term land and resource management. 2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management. 3. Minor changes in standards and guidelines. 4. Opportunities for additional projects or activities that will contribute to achievement of the management prescription. FSH 1926.52, Changes to the Land Management Plan That are Significant, states, “The following examples indicate circumstances that may cause a significant change to a land management plan: 1. Changes that would significantly alter the long-term relationship between levels of multiple-use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000 (see 36 CFR parts 200 to 299, revised as of July 1, 2000)). 2. Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period. When a significant change needs to be made to the land management plan, the forest, grassland, prairie, or other comparable administrative unit supervisor shall prepare an amendment. Documentation of a significant change, including the necessary analysis and evaluation should focus on the issues that have triggered the need for the change. In developing and obtaining approval of the amendment for significant change to the land management plan, follow the same procedures as are required for developing and approving the land management plan. (See sections 219.10(f) and 219.12 of the planning regulations in effect before November 9, 2000 (36 CFR parts 200 to 299, revised as of July 1, 2000)).” No changes or additional analyses are needed as this is a general request for information. Examples of non-significant forest plan amendments include the recent Rosemont Copper Project (see

		http://rosemonteis.us/files/final-eis/rosemont-feis-draft-rod.pdf), oil and gas leasing analyses (see http://data.ecosystem-management.org/nepaweb/nepa_project_exp.php?project=29938), travel management analyses and decisions (see http://www.redrockcountry.org/about-us/tmr/tmr-home/20110830CoconinoTMRRecordOfDecisionSIGNED.pdf), and analyses that add wildland fire management direction to the forest plan, see http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/56012_FSPLT2_117938.pdf)
Springer, Abraham	2. What is the timing of plan amendments relative to the EIS?	(162-10) The plan amendments, since they are part of the action alternatives, were displayed in the DEIS in Appendix B. They will be displayed in a similar manner in the FEIS. Should the responsible officials determine that plan amendments are part of the selected alternative, they would be incorporated into the draft Record of Decision that is sent out for public review during the objection period.
Springer, Abraham	3. Besides table 2, where can we find more details about the proposed plan amendments (especially regarding interspace)?	(162-11) The DEIS, Appendix B, addressed the proposed plan amendments from page 439 to page 564. The DEIS defines openness as interspace (page 347). The DEIS explains the treatment types and associated openness by disclosing the treatment descriptions, objective sand acres in three tables: Table 17 for Alternative B, Table 24 for Alternative C and Table 27 for Alternative D. Openness in these tables is described where it is an objective. DEIS page 96 compares and summarizes openness by alterative. DEIS Table 40 is also a comparison of the alternatives relative to attaining interspaces and tree groups by acres. This table displays the treatment intensity to treatment type. Appendix D in the DEIS is the Implementation plan for Alternatives B through D which provides specific guidelines for sizes of openings and how much openness can be created. The specific guidelines for opening sizes are displayed by the average range of interspace width (in feet) by the distances between tree groups. This is disclosed in DEIS Table 118, 121, 124, 128, 131, and 134. The specific guidelines for 'how much' openness can be created is in DEIS Table 120, 123, 126, 130, 133, and 136. The variable averages in these multiple tables would ensure that opening sizes would not exhibit identical patterns across the project area.
Springer,	4. In appendix B it is stated "the interspaces between groups may	(162-12) Thank you for your comment and concern. Although you

Abraham	range from 20 to 200 feet, but generally between 25 and 100 feet apart from drip line to adjacent drip line". Could you, please, provide a distribution of the different interspace distances (eg. 20% 25-40', 40% 40-80', etc.)? This would be very helpful in evaluating how planned interspaces may affect snowpack accumulation and retention that will have a large effect on water balance.	specifically asked about interspace, our response focuses on openness and openings (including regeneration openings) In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what

		is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Springer, Abraham	5. Would changing 3 experimental watersheds to evidence-based restoration require a plan amendment? One of the watersheds (LM-3L) is essentially already evidence-based, since >90% has a savanna prescription.	(162-13) No plan amendment would be needed to conduct the paired watershed study. If the treatments were changed to one that resulted in 90 percent opening, a plan amendment would be needed. However, in the FEIS, the only change is the inclusion of full control watersheds. All other treatments remain as disclosed in the DEIS.
Springer, Abraham	We prefer the term “water balance research” to “water yield research”. Improved soil water storage is as important, if not more important, than increased surface water yield, because maintaining adequate soil water storage would allow for greater forest resilience	(162-14) Although the term “water balance research” better describes the objectives of the proposed research, “paired watershed study” is more easily understood by the general public and other stakeholders. The FEIS will therefore refer to the research as “paired watershed

	that will help sustain forest cover that is critical for overall watershed health, especially in the face of climate change/variability.	study" although we recognize the complexity and comprehensive nature of the study.
Springer, Abraham	Questions and comments regarding Major Conclusions 1. If only 41-44% of treated areas will have a mosaic of interspaces and tree groups, what will the other 56-59% look like? Will the trees be more evenly distributed or will the treatment be so light that there won't be interspaces?	(162-15) Table 31 in chapter 2 of the DEIS provides additional information on the post-treatment degree of interspace. In this table, the heterogeneity section includes the percent openness or interspace is described as "Percentage of the forested area that is grass-forb-shrub interspace within ponderosa pine. Very open is 70 to 90% interspace, Open is 40-70% interspace, moderately closed is 25 to 40% interspace and closed is <25% interspace. All of the landscape would have a mosaic of interspaces and tree groups – but to varying degrees as the percentage of openness increases. Table 31 also provides a spatial arrangement evaluation which describes, by alternative, the ability to sustain the mosaic of interspaces and tree groups by openness category. For the FEIS the summary which includes major conclusions (as well as the summary of effect table in chapter 2) has been revised to improve clarity. (162-16) The summary was not designed to be the all-inclusive effects disclosure. The reader should go to the main body of the document for additional clarity. Since the DEIS was intended to be a summary of the analysis, referring to the specialist report would also provide additional information. The body of the document described the concept of openness on page 9 to 11 and on page 33 of the silviculture report. Table 31 in chapter 2 of the DEIS provides additional information on the post-treatment degree of interspace. In this table, the heterogeneity section includes the percent openness or interspace is described as "Percentage of the forested area that is grass-forb-shrub interspace within ponderosa pine. Very open is 70 to 90% interspace, Open is 40-70% interspace, moderately closed is 25 to 40% interspace and closed is <25% interspace. Density-related mortality zone is described on page 13 of the DEIS and to a greater degree in the silviculture report on pages 28-29. Bark beetle hazard rating is described on page 17 and 18 of the DEIS and to greater detail in the silviculture specialist report on pages 50-51.
Springer, Abraham	. In the third bullet, perhaps it would be helpful to reference where measurement of "closed canopy" is defined. Or maybe in the paragraph ahead of the bulleted list you could direct readers to the glossary for terms such as closed canopy (add to glossary), density-related mortality zone and bark beetle hazard rating (add to glossary).	
Springer, Abraham	Please define the desired conditions for soil and watershed function or reference where in the document these can be found. In general the summary refers to desired conditions numerous times without defining them or directing the reader to definitions elsewhere in the	(162-17) Desired conditions for soils can be found on page 25, paragraph 5 of the DEIS. Desired conditions for watersheds can be found on page 26, paragraph 2.

	document. Please, provide direction to definitions, if possible. Because the desired condition information is scattered throughout the document, perhaps a summary table of desired conditions in the appendix would be helpful. (Later in the review Tables 16 and 31 provide much of this information. Perhaps reference to tables 16 and 31 could be made earlier in the document.)	
Springer, Abraham	Page 21 – Forest Resiliency The Rio de Flag watershed is not a source of water for the City of Flagstaff. Concern about the Rio de Flag centers on flood risk due to forest being highly susceptible to crown fire.	(162-18) Thank you for your comment. We agree that the Rio de Flag is not a source of water for the City of Flagstaff. This information will be corrected in the FEIS.
Springer, Abraham	Page 25 – Fire Regime Condition Class; Soil Productivity and Watershed Function Are there any plans to base treatment sequencing on FRCC? Treating areas with a high percentage of FRCC first seems like it would be a wise course of action. I can see why the Forest Service would not want to be held to a strict sequencing design, but it would be helpful to evaluate the overall action if there were some indication of anticipated sequencing.	(162-19) As you know, recommendations to include sequencing in the NEPA analysis have been considered outside the scope of this analysis. The disclosure of sequencing within a NEPA document would be problematic because it would bind the Agency to a fixed schedule that may be unattainable due to weather, fires, markets, or other unforeseen circumstances. It would likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS does not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation is most appropriately addressed in implementation and operations.
Springer, Abraham	How have soil condition and function been determined? Please, provide a brief explanation.	(162-20) Please see Methodology and Analysis Process on page 8 of the Soil Resources Specialist's Report that is included by reference in the DEIS (p 105).
Springer, Abraham	Are there treatments planned in the 15% of area that does not have satisfactory soil condition? If so, what mitigating measures are planned?	
Springer, Abraham	Page 26 - Watersheds at the 6th Hydrologic Unit Code (HUC) Scale; Springs Please, include a Hydrologic Condition Framework map for the project area so we can visually see where the priorities areas are. In most cases returning roads to their natural condition is prohibitively expensive and unnecessary	(162-22) We assumed this comment is intended to reference the Watershed Condition Framework rather than Hydrologic Condition Framework. Watershed conditions for all National Forest System lands, including those within the 4FRI analysis area are available online at: WCATT 1.3.0 (Build 40) The framework information was used to inform the analysis of watershed conditions. This information with the map has been included in the soils project record documentation.
Springer, Abraham	We recommend an emphasis on engineering assessment of road drainage and simple measures to reduce long-term concentration of	(162-23) Page 28, paragraph 4 of the DEIS states "the desired condition is to restore decommissioned road prisms to their natural condition

	water along roadways, such as replacement of culverts with rolling water bars and mulching of abandoned roadbeds.	(USDA 1987, USDA 1988).
Springer, Abraham	This section is pretty vague about what would actually be done. If there is greater detail elsewhere in the document, such as Table 111, please reference it.	(162-24) We assumed this referred to actions around springs. Table 16 in the DEIS provides the specific existing and desired condition, the possible management actions and the triggers and thresholds for actions in springs and ephemeral channels. This adaptive management table is part of all action alternatives.
Springer, Abraham	By “major watersheds” do you mean 5th code watersheds? Please, clarify, since earlier there was discussion of the 6th code watersheds.	(162-25) Thank you for your comment. The terminology in the FEIS will be modified to be specific to 5thand 6thcode watersheds.
Springer, Abraham	Page 28 – Ephemeral Streams Define ephemeral channel functionality.	(162-26) Ephemeral channel functionality has been described on page iii, paragraph 5 of the DEIS. Desired conditions for ephemeral channels are described on page 27, paragraph 5 and page 28, paragraph 1 of the DEIS. Desired conditions for ephemeral channels are more specifically described on page 8, paragraph 2 of the Water Quality and Riparian Areas Specialist’s Report as, “Ephemeral, intermittent, and perennial waters flow in natural patterns and at natural rates, have favorable flood plains, transport bed load adequately, and maintain longer sustained base flows on the landscape, rather than extreme peak flows. This will reduce flood potential”.
Springer, Abraham	if all roadbeds were to be ripped to restore the beds to natural condition, this would cause a tremendous amount of disturbance that would likely promote a flush of invasive plant growth	(162-27) Please see our previous response.
Springer, Abraham	Page 38 - Issue 4: Increased Restoration and Research Again, please use the term “water balance” rather than “water yield”. Yield is only one part of what we will investigate and is not more important than the other parts of the water balance. Please, search and replace throughout the document so that instead of “water yield” it reads “water balance”, unless water yield is explicitly intended.	(162-28) Please see our previous response.
Springer, Abraham	We are curious about the typical characteristic of a research natural area. Would the paired watershed study area qualify to be an RNA? Are there benefits associated with being an RNA?	(162-29) An RNA is a forest plan land allocation and not associated with a proposed project. An RNA is to be managed to perpetuate natural processes. There are no activities proposed in designated or proposed RNAs.
Springer, Abraham	Page 60 – Table 15 - Large tree retention strategy and large tree implementation plan crosswalk The LTRS to LTIP crosswalk seems kind of jumbled and incomplete. For instance, I wanted to compare the LTRS to the LTIP with regards to riparian areas in order to evaluate the appropriateness of Design Criteria SW8, but I cannot	(162-30) Thank you for your recommendation. The complete crosswalk is available in the project record. Putting the entire crosswalk into the EIS would have added more pages than was deemed necessary.

Springer, Abraham	find in the document where LTIP addresses riparian areas. For those of us who worked to develop the LTRS, Table 15 would be easier to follow if the LTRS column were laid out in the same order as the LTRS, so that there is a complete crosswalk, rather than a partial crosswalk. Page 66 -Table 16 - Alternative B–D springs, channels, and roads adaptive management actions Is there some sense of how much total area might be treated by an essentially evidence-based restoration approach according to, “Remove tree canopy to pre-settlement condition within 2–5 chains of the spring”? It seems like evidence-based restoration could be applied to 1.2 to 7.8 acres surrounding each spring. Dr. Abe Springer and ERI would be very interested to know how the Forest Service will determine the desired acres of pre-settlement condition around springs.	(162-31) The reference to “2-5 chains” is for demonstrational purposes only. It is anticipated that springs restoration would be implemented under consultation and coordination of local spring experts at NAU, the Museum of Northern Arizona, and Spring Stewardship Institute.
Springer, Abraham	Page 95 – Comparison of alternatives It is not clear how/why Alternative C has a greater number of treatment acres than Alternative B. Due to the control watersheds the paired watershed study would result in about 2,500 less acres of mechanical treatment but the same amount of burned acres, because of burn only treatments, as the DEIS is currently composed. How do other purposes of the Alternative C lead to more acres treated? Where are the additional 45,512 acres of mechanical and 5,288 acres of burn treatments? Later in table 31 it looks like restoration of encroached grassland may account for most of this difference and the alternative description says these grassland treatments will mainly be on the Kaibab NF. Whereabouts are these grassland restoration sites?	(162-32) The additional acres in alternative C are from the grassland restoration treatments. Chapter 2 of the DEIS provides a treatment description and acreage table for each alternative (table 24 for alternative C). For alternative C, the general locations of the grassland treatments are displayed on figure 32, page 87. General locations include Government and Garland Prairie.
Springer, Abraham	perhaps there needs to be a monitoring mechanism built in so that management for oak can be adapted if it turns out treatments are resulting in excessive proliferation of oak	(162-33) This comment should have been part of the previous comment. Please see our response to 162-32.
Springer, Abraham	Page 101 - Table 31 Please reference the glossary at the first instance of “proper functioning condition”. Also, be consistent in using “proper” (used in report body) rather than “properly” (used in glossary).	(162-34) Thank you for your comment. The glossary has been updated in the FEIS to reflect "proper functioning condition (PFC).
Springer, Abraham	Page 104 - Table 31 Please describe briefly in the table how you arrived at “No watershed would have soil disturbance above 11%, which is 4% below the 15% threshold.” For “Landscape-Scale Forest Resiliency and Function” you may want to mention that restoration	(162-35) Table 32 of the DEIS displays soil disturbance and erosion by treatment area and aggregate of 6thcode watersheds by alternative. The soils report describes all methodology and modeling used for the analysis on page 47 to page 58.

	treatments will likely improve soil water storage, which will help improve tree vigor and make trees more resilient to pathogens, insects and climate variability.	
Springer, Abraham	Page 108 - Oak Creek has had many more than 2 exceedences of the water quality standard for E. coli and at more than one location. Discuss with Sharon Masek Lopez or Arizona Department of Environmental Quality if greater detail is desired. "Escherichia coliform (E. coli)" should read "Escherichia coli (E. coli)". Note the use of "coli" rather than "coliform" and italics rather than no italics.	(162-36) The Riparian and Water Quality Specialist's Report and DEIS will be revised to reflect this information. In 2013 there were no exceedances per data gathered from Friends of Forest and Slide Rock State Park. The Riparian and Water Quality Specialist's Report and FEIS will be revised to correct the syntax of the Escherichia coli (E. coli).
Springer, Abraham	Lower Lake Mary is not a designated domestic water source, so far as we know. Upper Lake Make is a designated municipal water source.	(162-37) The Riparian and Water Quality Specialist's Report and FEIS will be revised to properly reflect Upper Lake Mary as the only municipal water source in the Lake Mary watershed.
Springer, Abraham	Covington and Moore (1994) would be a good citation for the statement "Water yields from the ponderosa pine vegetation type are likely reduced from historic conditions due to increased stand densities that result in higher evapotranspiration rates." Covington, W. Wallace and Margaret M. Moore. 1994. Southwestern ponderosa forest structure – Changes since Euro-American settlement. Journal of Forestry, 92 (1) 39-47.	(162-38) The citation will be added to the Riparian and Water Quality Specialist's Report and FEIS to support the statement related to reduced water yields from the ponderosa pine vegetation type.
Springer, Abraham	Page 129 – Table 43 This table is difficult to understand/interpret. The tree groups, if they are based on single size classes, do not appear to allow for heterogeneity of sizes within tree groups (ie. the description does not reflect reality where groups are often composed of various size classes). Also, it is unlikely to find 11 VSS 6 trees in a ½ acre group that would give a closed canopy, but you could find a mix of VSS 4, 5, and 6 in a half acre group that would give closed canopy. Please, explain how heterogeneous groups would be composed. As an example of how the VSS-6 canopy cover does not seem realistic, on Sharon Masek Lopez' residential 0.10-acre there are ponderosa pine trees with interlocking canopy (if you count the house roof and the neighbor's roof as part of the canopy, which the squirrels clearly do). The property has already been somewhat thinned, since at least two large trees were removed for the home site and subsequently 5 VSS-3 or -4 trees were removed to improve spacing. Now on 0.10 acre there is this distribution of trees: VSS3 - 2, VSS4 - 3, VSS5 - 2 and VSS6 - 1. Although the canopy is interlocking, it only covers about 1/2 of the 10th-acre lot. It does not seem possible to achieve complete	(162-39) The implementation plan (DEIS Appendix D) includes a variety of designs that utilize a "read the land" approach. For example on Pgs. 616, 619, 622, 624, 629, 632 and 634 - Overall, average group size would vary within this range depending on site quality, existing stand structure, and pre-settlement tree evidence; Table 139 includes guidance on placement of tree groups, interspace and regeneration openings. The placement would vary depending on existing conditions. Along with the design, Table 140 (DEIS Pg. 654) emphasizes that interspace, regeneration openings, tree group density and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (pg. 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size) and the amount of regeneration openings may be made during implementation to ensure tree group density remains outside of the "red zone" density.

	canopy cover on 1/10 acre with any of the groups described in table 44. Is it presumed that there will be some within-group openings? If so, please describe more completely how groups and within-group openings will be selected	
Springer, Abraham	Page 462 - Appendix B – plan amendments With interspaces of 20 to 200 feet but generally 25-100 feet, forest pattern will not be optimal for snowpack accumulation and retention, which is one of the stated Within-Stand Openings Desired Conditions: Openings promote snowpack accumulation and retention which benefits groundwater recharge and watershed processes at the fine (1 to 10 acres) scale. If a typical ponderosa tree high is 80 feet tall then, according to research by Ffolliott and others, the best typical opening (aka interspace) size would be up to 120 to 160 feet (1.5 to 2 times the height of adjacent trees). NAU recommends extending the typical opening size range to 120 feet and adding explanation about the snowpack management benefits of opening sizes 90 to 140 feet in diameter. Also, the 3/10 to 8/10 acre opening size does not seem consistent with 25-100 feet width of openings. Is the desire for long, skinny openings? NAU recommends a field exercise to make sure the guidelines are operationally practical.	(162-40) Please see our previous response.
Springer, Abraham	Page 29 – Roads and Unauthorized Routes Again, while the desired condition may be to restore decommissioned road prisms to their natural condition, this may be prohibitively expensive. It is not uncommon to find historic roads in the forest that have naturally revegetated and are stable. The focus should be on making sure that road prisms have frequent and adequate channels across them so that water can pass without being concentrated on or along the roadbed. Also, removal of culverts is advisable, since without ongoing maintenance they are like to plug and cause erosion and sedimentation. Some of these culverts could likely be reused for temporary roads associated with restoration work or they could be recycled, both of which may help defray costs for the contractor. While road decommissioning is very important for soil and watershed condition, doing it in an economically practical fashion is necessary to ensure that practices will be adequately implemented	(162-41) Page 28, paragraph 4 states “the desired condition is to restore decommissioned road prisms to their natural condition (USDA 1987, USDA 1988).” Appendix C – Design Features, BMPs, and Mitigation includes soil and water resources BMPs designed to prevent degradation water quality during and after forest treatments, including road decommissioning.
Springer, Abraham	Ponderosa pine restoration treatments for the purpose of restoring springs is a novel approach, with little or no literature to support the	(162-42) Please see our previous response (162-41).

	supposition in table 16 that a 2-5 chain radius is appropriate. We encourage the Forest Service to treat this as a research opportunity and test varying treatment intensities and radii around springs to determine which treatments are most beneficial. Through research, monitoring and an adaptive management process, we may overtime come to understand the best approaches for restoring ponderosa pine forest to benefit spring ecosystems.	
Springer, Abraham	Page 99 – Vegetation diversity and competition The prescriptions for reducing pine-oak competition seem excessive, given oak's natural ability to proliferate after ponderosa pine thinning, especially on limestone-derived soils (as demonstrated in the Beaver Creek study and along powerlines in the southern part of Coconino NF). From a watershed management perspective, favoring oak in this way would likely rapidly negate any water yield gains, since vigorous oak growth would rapidly increase evapotranspiration. It is understandable that oak is valued for its benefits to wildlife, but	(162-43) The purpose and need for the project includes promoting and maintaining oak for wildlife benefits, particularly Mexican spotted owl habitat. The silviculture analysis indicates that in 2020 the overall average Gambel oak basal area would be above minimum desired in all habitats except RU 5 restricted other where it would be a limited component within that landscape. By 2050, the basal area would be above the minimum desired in all habitats except in RU 5 restricted other. Thank you for your recommendation.
Springer, Abraham	The Center for Biological Diversity is likely to oppose measurement of canopy cover at the group level. They want to see the overall canopy cover, because of species that are associated with denser canopy. Could you provide a comparison of both group-level canopy cover and overall canopy cover in the DEIS, so that it is clear how much difference there is when each method of estimation is used?	(162-44) Please see our previous response on post-treatment openness. The analysis meets the Coconino NF forest plan requirement for management of canopy cover in VSS 4 to VSS 6 in goshawk habitat. The analysis meets the requirement in the Kaibab NF forest plan (USDA 2014) to have forest conditions in some areas contain 10 to 20 percent higher basal area in mid-aged to old tree groups than in the general forest (e.g. goshawk post-fledging family areas, Mexican spotted owl nesting/roosting habitat, drainages, and steep north-facing slopes at the mid-scale in ponderosa pine (page 18) Additional information will be added to the FEIS that provides the change in openness (interspace) by habitat type. See the chapter 2 comparison of alternatives tables.
Springer, Abraham	Appendix C – Design features, BMPs and Mitigation Design Criteria number SW2 – This is a big concern. Because of the volume of fiber that needs to be removed each year, the contractor may be tempted to push the envelope and put equipment on the ground when soil moisture conditions are not favorable. Can some consequences (such as financial penalties) be imposed as part of this design criteria?	(162-45) This comment addresses a contract compliance issue and is not directly related to the NEPA analysis. Contract compliance issues would be addressed during project implementation. The DEIS included adequate design features and BMPs are in place to protect soil and water (DEIS, Appendix C, pages 580-59
Springer, Abraham	Design Criteria number SM4 – The invasive species of concern, which this design criteria addresses, should be listed but they are not	(162-46) The invasive species of concern are listed in the invasive weed section of the DEIS. Specific design features exist for specific species of concern such as leafy spurge (B22 and B23 in appendix C of the FEIS). B24 states, "Incorporate surveys for rate and endemic plants into

		surveys for Region 3 sensitive plants and/or noxious or invasive weeds prior to implementation. Survey needs will be dependent on known or potential occurrences in the treatment area".
Springer, Abraham	Design Criteria number SWX – There should be design criteria that describe how planned hauling and burning practices may minimize soil burn severity. A member of the 4FRI team has previously given the impression that, as far as possible, “haul to the lead” would be used to bring unlimbed trees to a landing where they would be limbed, the limbs shredded and chips hauled for biomass production and the logs hauled for use in saw timber and/or composite wood products. Hence, there would probably remain at the landing some concentrated material that would likely burn at a high temperature, but little slash burned out in the unit. Please, discuss to what extent “haul to the lead” or other similar practices will be used.	(162-47) This comment is likely referencing a term known as “felling to the lead” whereby trees are felled in a predetermined direction to facilitate transport to the landing. This practice minimizes soil disturbance by reducing the number of turns necessary to position the machinery for skidding of harvested trees. Transporting (i.e., skidding) of trees with limbs intact is known as whole-tree skidding. This practice also reduces soil disturbance in comparison to skidding of limbed logs by reducing soil gouging. Concentrated material at landings could either be utilized or distributed across treatment areas to minimize burn severity. This BMP would be implemented on every acre mechanical treatment in alignment with the coarse woody debris BMP that is designed to meet forest plan requirements.
Springer, Abraham	Design Criteria number SW8 (page 582) – This design criteria does not sound consistent with the LTRS ? LTIP. Please, cross-check between this design criteria and the Large Tree Implementation Plan to see if the two are compatible with regards to ephemeral channels and riparian areas	(162-48) SW8 (DEIS, page 583) refers to a common Best Management Practice designed to protect water quality during forest mechanical operations. The purpose of establishing vegetative filter strips is to prevent sediment delivery to stream courses. This BMP is also intended to reduce fire intensity (and therefore soil burn severity) on areas located in close proximity to water bodies and ephemeral channels.
Springer, Abraham	In closing, we would like the 4FRI Team to know that we have read, concur with and fully support the comments being submitted by Salt River Project regarding the DEIS. SRP, NAU and the Ecological Restoration Institute are collaborative partners in designing the paired watershed study and seeking funding and other commitments for implementation of the study. We are all dedicated to protecting the health of Arizona’s watersheds through restoration of healthier forests. Thank you for the opportunity to comment.	(162-49) Thank you for your continued interest and participation.
Steinhardt, Ann	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting	Thank you for your comment. Please see our response to Letter #19.

wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.

stewart, douglas

If the governmental departments, such as the US Forest Service, that are committing genocide upon vital environmental aspects of the only planet we have to live on, would simply use suicide upon their destructive projects – such as 4FRI – instead of upon our entire

(139-1) Thank you for taking the time to provide your opinions. We recommend you read the DEIS, particularly chapters 1 and 3.

Strom, Randy	civilization, we would all be MUCH better off as we attempt to march on into an increasingly difficult environmental future! The new restoration initiatives that are proposed,are not taking into consideration that the US forest are PUBLIC lands and are set aside for multiple use by everyone including all legal activities. Although I agree with burning and thinning projects,the road closures and loss of access is not in the best interest of the public.In 2012 a lot of roads were closed in the name of protecting the forest. What it actually did was to force groups of people with very different interest into a much smaller area,creating a lot of bad feelings. For example,hikers,bicyclist,tourist,offroad vehicles,hunters, woodcutters,and in general anyone just wanting to enjoy the forest. Also the new rules that keep campers 30ft.from the edge of the road,except where designated,was a terrible Idea.It shoved all campers into a small area,the idea of camping is to get away from other people! The people that braved the roadside camping basically had to keep their children on a leash,and ate a lot of dust from the constant traffic. Also the roads that were kept open were not maintained as to allow access for even the most capable vehicles.I do think that certain areas that are sensitive should be protected! But what has happened is that the only people that have access to the forest anymore are athletes,and helicopter pilots. I think that this should be looked at again ,with more information gathered from the general public. Also I think it should be widely advertised. It seemed	(57-1) Thank you for your comment. (57-2) Thank you for your comment. Any changes to each Forest's transportation system is outside the scope of the 4FRI analysis. This analysis will not make any decisions that would change the miles of open road or road use stipulations. The DEIS (web-based DEIS, page 28) states, "The Coconino and Kaibab NFs have identified the needed road system for public and administrative motorized use through the Travel Management Rule (TMR) process (see the transportation specialist report for details on forestwide transportation analyses). The TMR process identified a need to decommission approximately 770 miles of existing system and unauthorized roads on the Coconino NF. This number was refined in the FEIS to 726 miles. On the Kaibab NF, approximately 134 miles of unauthorized roads (often referred to as user-created routes) were recommended for decommissioning". This analysis focuses on the environmental impacts associated with decommissioning existing roads, unauthorized routes and providing adequate toad access to the project to facilitate implementation. The environmental consequences for transportation are located on page 318 to page 321 of the DEIS (web version). As noted above, the transportation analysis in the FEIS has been updated with final road miles. Your comment has been forwarded to the Environmental Coordinators on the Coconino NF and the Kaibab NF as annual updates to the motor vehicle use map will occur.
Strom, Randy	that this was almost done secretly with only special interest groups involved.	
Stuckey, Matthew	While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern	(189-1) Thank you for your comment. Please see the response to Letter #19.

Sullenberger, Nathan	goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental	Thank you for your comment. Please see our response to Letter #19.

	Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Summerfelt, Paul	On behalf of the City of Flagstaff Fire Dept, we appreciate the huge amount of work that has gone into development of this document, and the opportunity provided to comment. This is truly a historic approach to the pressing need to protect and ensure the long-term sustainability of our forests (and communities) in the greater Flagstaff and northern AZ area. Congratulations are in order for all those who have worked so long and hard to get us to this point.	(40-1) Thank you for your comment and participation in this project.
Summerfelt	The four key issues captured on p. iv of the Summary - Prescribed	(40-2) Thank you for your comment.

, Paul	Fire Emissions, Conservation of Large Trees, Post-treatment Canopy Cover and Landscape Openness, and Increased Restoration and Research - seem to adequately describe key issues. Specifically in regards to these issues: Prescribed Fire Emissions - Emissions from any wildland fire are of concern, but we recognize that emissions produced under prescribed fire conditions are more tolerable, of shorter duration, and far less impactful than that produced by large-scale, destructive wildfire events. We cannot prevent smoke - our forests will burn, and the trend over the past decade or more is toward more severe wildfires. Nor can we afford to overlook the fact that prescribed fire, where we manage both conditions and results, is required for ecosystem health and one of the most cost-effective and proactive tools we have to prevent and/or reduce the catastrophic wildfire (s) in our near future. We applaud the Forest Service for recognizing the challenges of managing fire, but including this treatment in the DEIS.	
Summerfelt, Paul	Conservation of Large Trees - The Large Tree Retention Strategy (LTRS) was developed by various stakeholders over an extended period of time. Although excluded from the August 2011 Proposed Action, it's inclusion in the DEIS is certainly a good-faith effort by the Agency to honor the work of those who labored over its creation and adoption: undoubtedly, there will be comments provided by others in regards to the Strategy incorporation and use, and we encourage the Agency to further incorporate those issues where appropriate and possible.	(40-3) Thank you for your comment. We have addressed the conservation of both old and large, young trees. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641 (web-based version of the DEIS). Examples of treatment design include: “Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention” (page 627). Page 627 of the plan also states, “Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain the desired tree cover range. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: “Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree

Summerfelt, Paul	Post-treatment Canopy Cover and Landscape Openness- We recognize the historical "open forest", and welcome a return to that condition where appropriate and to the extent possible. Such a condition reduces the threat of severe-and-damaging wildfire, and improves resilience to climate change and insect outbreaks. Improvements of understory bio-diversity• and water recharge/yield are also positive aspects of this condition. But we also recognize that for many, too much "openness" can be an issue that moves them	implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component". In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. (40-4) Thank you for your comment and concern. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement

away from support of the project, rather than toward it. Recognition of this social reality, and taking steps to address it so it does not become a divisive issue, are marks of an attentive and responsive Agency and we urge you to continue to seek common-ground and understanding.

tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the "red zone" density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be

		accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Summerfelt, Paul	Increased Restoration and Research: This effort certainly provides unique and valuable opportunities to adaptively manage both treatments and effects, in their broadest possible context (technology, social, ecosystem, etc). Incorporation of new material, such as the MSO Recovery Plan - 2012, is an excellent approach. We should not be afraid of seeking out and using such information, for after all, we know very well the inevitable results of inaction, slow implementation, outdated processes, and the short shelf-life of "state-of-the-art" methodology.	(40-5) Thank you for your comment. We look forward to seeing the outcomes of the watershed and small mammal research.
Summerfelt, Paul	Three particular items drew our attention that if revised would more accurately reflect current reality: 1) Table 150 (p. 686)- City of Flagstaff efforts are not included (they are separate from, and not necessarily reflected by, the Greater Flagstaff Forests Partnership); 2) Table 156 (p. 694) - City of Flagstaff projects and acres are not listed, and, as above, are not necessarily included in or reflected by projects and acres attributed to the Greater FlagstaffForests Partnership; and 3) Acres identified for the Flagstaff Watershed Protection Project -FWPP - (p. 697) is inaccurate (we recognize that	(40-6) Thank you for the specific information regarding cumulative effects. In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2 of the FEIS) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the Flagstaff Watershed Protection Project and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F

	at the time the document was created, what is shown was a rough idea, but the acreage of the FWPP has since been firmly identified).	in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts.
Summerfelt, Paul	In closing, we concur with selection of Alternative C as the Preferred Alternative. It treats the most acreage, has the longest positive effect over time, responds to key issues, and incorporates a number of innovative features and approaches. Others will likely provide recommendations or other options to critical items and issues that will warrant evaluation for inclusion in the final EIS. But, we are satisfied with the plan as it now stands, knowing full well that our communities, forests, and all of the northern AZ area is dependent upon this project moving forward. We look forward to the Record of.Decision (R?D), our continued joincollabor tion,treatment •mplementation, and the opportumty to collectively learn and make a difference m our ommunity and area. Thanks for your leadership, and your eagerness to partner with others, in this effort!	(40-7) Thank you for your comment and participation in this project.
Thomas, Reynold	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. While I appreciate the goals of the Four Forest Restoration Initiative (4FRI) that focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The proposal is vague about how "open" the forests will become after the proposed treatment. This is important as it could negatively affect a number of wildlife species that depend on forest canopy. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean more trees are cut, there is significantly less canopy cover, and a much larger and negative impact on canopy dependent species such as the northern goshawk. Types of openings being proposed include regeneration openings, interspaces, Vegetation Structure State 1 (grass/forb/seedling), Vegetation Structure Stage 2 (saplings 1-4.9"), and other canopy gaps. The	Thank you for your comment. Please see our response to Letter #19.

Thurman, Ricky	Forest Service should provide more specific guidelines for the sizes of these openings and how much openness can be created cumulatively by these openings. Also, guidelines should be provided so that tree group and forest opening sizes are varied. Stakeholders, including Sierra Club and other conservation groups, created a document to specify that old growth would be protected and to protect larger trees with limited exceptions. The Forest Service should make this document on large tree retention an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. The Forest Service should be sure that metrics and measurements are applied consistently across the Environmental Impact Statement and during implementation. It should not apply tools designed to measure and treat large stands of trees at the scale of smaller tree groups. Also, scales and metrics should be consistently applied so that pre-treatment forest measurements can be compared to the predicted post-treatment maps. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS.	(190-1) Thank you for your comment and interest in the 4FRI. Please see the response to letter #19.

Vollherbst, Karleen	This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these	(140-1) Please see the response to letter #19.

	concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Wachsler, Sharon	I vehemently oppose the proposed destruction of forests in Arizona called The Four Forests Restoration Initiative ("4FRI"). I really expected better from the Obama administration.	(123-1) Thank you for your comment. The purpose and need for this much needed restoration project can be found on page 8 of the DEIS. Please see our response to letter 6, 11, and 74.
Wachsler, Sharon	That much burning will cause untold health effects for the people in the surrounding areas, who will be breathing in smoke, partciulate, and other products of combustion. This will send many people to the hospital and possibly result in deaths for those who are at greater	(123-2) Thank you for your comment. Please see our responses in letter 6, 11 and 74.

risk due to pulmonary or other issues. - Knowing that climate change is severely affected by carbon emissions, that we would choose to needlessly produce such a huge quantity of smoke and pour so much carbon in the air while simultaneously destroying the most effective carbon emissions control the plant has -- TREES -- is unthinkable.

(123-3) Thank you for your comment. Please, at a minimum, read the wildlife environmental analysis in chapter 3 of the DEIS. The DEIS states that treatments in alternative C (preferred alternative), "includes recommendations from the U.S. Fish and Wildlife Service (FWS) by increasing prescribed burning treatments within protected Mexican spotted owl (MSO) habitat (to improve the quality of owl roosting and nesting habitat), and aligning treatments in threshold habitat with the "Mexican Spotted Owl Recovery Plan, First Revision" (USDI 2012) (DEIS, page 47). Alternatives B-D included forest plan amendments. In response to comments on the DEIS, an alternative that proposes no forest plan amendments was developed (alternative E). In the FEIS, each resource discloses the effects associated with omitting plan amendments. Additional analysis has been added to the FEIS. A summary in chapter 2 on the environmental consequences for MSO habitat states, "In MSO nesting and roosting habitat, there would be no change between alternatives A-E in percent of openness. The percent openness (degree of heterogeneity) would remain the same as the existing condition. This is because thinning treatments would limit the removal of the overstory structure. In alternative A in MSO restricted (all) habitat, the percent of openness would remain the same as in the existing condition. Existing interspace would continue to be encroached upon by expanding tree crowns and ingrowth. In alternatives B-E there would be little change in the very open to open categories". In MSO protected habitat, several of the forest metrics are similar across alternatives in 2020 because minimal actions are proposed in PACs. Thinning, (not group selection) is proposed in PACs, in part to limit affects to overstory structure The percent of SDI max would decrease in all alternatives as a result of the proposed thinning. PACs would still remain in the highest density category ("extremely high density"), although alternative C would move the percent of SDI max to the bottom of this category in 2020, almost achieving a "high density" ranking (high density equals percent SDI max of 55 and lower). The

Wachsler, Sharon

- The area of the Arizona forest described includes 98% of protected habitat for the Mexican Spotted Owl. Is this initiative worth eliminating another species of bird from the earth?

potential decrease in crown fire risk is most prominent in alternative C, and alternative D makes the least change relative to the no action alternative. Implementing two prescribed fires would decrease surface fuel loading and increase canopy base height. The reduction in surface fuel loading would decrease the potential surface fire flame lengths. The higher canopy base height would mean it would take longer flame lengths to initiate crown fire. These two changes decrease the potential of high severity fire effects. Alternative D is the only (action) alternative where at least 30 percent of the habitat would return to FRCC 3, contrary to the purpose and need. A key result of these treatments would be increases in the percent of trees 24 inches d.b.h. and greater. Alternatives B-D would increase the density of this size-class the most. A similar pattern is evident among alternatives for trees in the next largest size-class (18 to 23.9 inches d.b.h.). Growing trees into the largest size-classes takes time and creating more large trees would be an important contribution to nesting and roosting habitat. Decreasing competition around presettlement trees should enhance their survival and overall health and potentially result in more large trees than displayed in the model results. Reducing abundant quantities of mid-sized trees and increasing areas dominated by large trees should improve MSO nesting and roosting habitat (USDI 1995, May and Gutierrez 2002, May et al. 2004, Blakesley et al. 2005).The biological assessment for the project was submitted to the FWS in February of 2014. The biological assessment concluded long-term effects of the 4FRI should be beneficial to MSOs by enhancing key habitat components for MSO and their prey. The likelihood of maintaining MSO habitat into the future is also enhanced by reducing the predicted risks from climate change-induced changes in temperature and precipitation patterns. However, there is potential for short-term adverse effects to owls and their habitat (Noble 2014). Because of the short-term risks of adverse effects, the project “may affect and is likely to adversely affect MSOs and their habitat, g critical habitat”, (Biological Assessment, pp. 238-239). The FWS biological opinion (AESO/SE 22140-2011-F-0145), which was signed by the FWS on October 20, 2014 affirmed this effects determination. The FWS found the preferred alternative would not jeopardize the continued existence of the Mexican spotted owl, and would not destroy or adversely modify its designated critical

		habitat (USDI FWS 2014, page 33).
Wachsler, Sharon	The Forestry Service has always has a hand-in-glove-in-pocketbook relationship with logging interests. This initiative seems to be no exception as it includes bringing in logging companies to harvest. Why do we continually put the interests of private corporations over the very life and future of individual citizens and indeed our entire planet? The only way this proposal makes "sense" to me is that it makes dollars and cents for the Forestry Service and the logging sector. It is not in the interests of those whose lives will be upended or perhaps even ended by exposure to millions of acres of burning forest, nor to all the trees, plants, and animals who will die in this destruction, nor to our children and grandchildren, who will have to live with the damaged air, water, and land we are leaving for them to try to survive in.	(123-4) Thank you for your opinion.
Waltz, Amy	Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Four Forest Restoration Initiative (4FRI). The mission of the Ecological Restoration Institute (ERI) is to serve as an objective leader in research, scholarship, and education, and in collaborative efforts to plan and implement restoration treatments for frequent-fire forest and woodland landscapes of the West. Fifteen years ago it was unimaginable to think that there would be broad public support for undertaking restoration at the scale envisioned by the 4FRI. The DEIS for the first analysis area is a bold effort to analyze and manage at the scale of the problems facing frequent fire forests. The Forest Service deserves credit for undertaking this innovative and necessary approach. The ERI staff have compiled comments on the DEIS with the goal of strengthening the scientific information that supports restoration. In addition, we endorse the 4FRI Stakeholder Group comments on the DEIS. We look forward to working with the Forest Service and the 4FRI Stakeholder Group to successfully restore ecological resilience to the forests of the Mogollon Rim. COMMENTS and RECOMMENDATIONS:	(165-64) Thank you for your time and attention.
Waltz, Amy	1. The ERI recommends that you re-evaluate the range of alternatives to re-affirm that the document meets 40 CFR 1502.14 & 1505.1 (e), and that it has an adequate analysis and/or a full spectrum of alternatives. Specifically, the ERI recommends the	(165-65) The DEIS (DEIS, pp. 48 to 104) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public. This is consistent with

	addition of natural range of variability metrics in key analysis tables in existing alternatives to show the departure from historic structural conditions post-treatment.	the Agency's direction on alternatives, "Develop and consider alternatives that would resolve conflicts about the proposal" (FSH 1909.14, page 32) and using collaboration, "Ongoing collaboration may often result in modification of a proposed action or alternative(s), resulting in a better proposal and ultimately a better decision. Such changes may not necessarily require the development of a new alternative if they can be accommodated through modification of an existing alternative" (FSH 1909.14, page 32). The IDT identified two metrics that will be added to the comparison of alternatives table and discussion: volume of emissions and potential effect to sensitive receptors (smoke). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments will be analyzed. This will increase the number of alternatives of alternatives considered in detail to five (including no action). More importantly than the sheer number of alternatives is whether unresolved issues have been addressed through alternative development or environmental analysis. The Agency's procedures for implementing NEPA state, "Under the CEQ regulations, the Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act"(40 CFR 1501.2(c)). No specific number of alternatives is required or prescribed. Develop other reasonable alternatives fully and impartially. Ensure that the range of alternatives does not prematurely foreclose options that might protect, restore, and enhance the environment" (FSH 1909.14, page 31). "The range of alternatives considered by the responsible official includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm "(FSH 1909.14.4, page 36). In response to comments on the DEIS, an analysis on movement towards the natural range of variability will be conducted and displayed in the FEIS.
Waltz, Amy	The Purpose and Need and other parts of the DEIS discuss restoration, "restore forest structure and pattern, forest health, and	(165-66) In response to comments on the DEIS, an analysis on movement towards the natural range of variability will be conducted

vegetation composition and diversity" (pg. 9 P&N). The Desired Condition statements discuss "reestablishing non forest openings that have been invaded by ponderosa pine since fire exclusion and reconfiguring the forests toward their natural spatial pattern" (pg. 11 P&D). In addition under Desired Conditions it states; "A characteristic of historic Southwest ponderosa pine forests was the grass/forb/shrub (interspace) interspersed among small groups of trees. This interspace typically comprised a large portion of the landscape" (pg. 9 P&N) and includes references from Woolsey, Cooper, White, Pearson, Covington, and other notable scientists. Yet, the DEIS does not include an evidence-based restoration alternative that incorporates this science and recreates those conditions that are supported by that research. Without an evidence-based restoration analysis, there is no way to adequately compare the tradeoffs between: a restoration alternative that replicates HRV and restores forests to prefire exclusion conditions, or an analysis that is designed to address restoration and issues associated with forest openness, closed canopy species, and canopy cover/closure (i.e., an alternative that moves toward comprehensive landscape-scale restoration). Not documenting an adequate analysis that displays the tradeoffs of the departure from the HRV is a concern to the ERI. Specifically, the ERI recommends the addition of natural range of variability metrics in key analysis tables to show the departure from or trajectory towards historic structural conditions post-treatment. These metrics include: a. Basal area b. Trees per acre c. Quadratic Mean Diameter (QMD) d. Canopy cover – as a stand-alone, this is poor metric; however, because much of the DEIS discusses "openness" and canopy cover in some manner, it is valuable to provide some historical ranges of canopy cover (see ERI fact sheet: http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH4699.dir/doc.pdf). e. The Historic Ranges of Variability paper Fact Sheet (Stoddard 2011 - http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH40b3.dir/doc.pdf) is a good example of how to display this information. We suggest using a figure that displays these metrics depicting HRV, current conditions, and expected post-treatment conditions at scales appropriate for metric (stand, RU, landscape):

and displayed in the FEIS. In addition, an evidence-based full restoration analysis was considered but eliminated from detailed analysis, see chapter 2 of the FEIS for a summary of why the alternative was eliminated and the project record for the complete analysis. A preliminary analysis indicated a full restoration alternative would adversely affect the quality and quantity of 100 percent (35,190 acres) of MSO protected habitat . In MSO restricted habitat, preliminary analysis indicated forest resiliency and the understory grass/forb/shrub matrix would be improved. However, the low BA would delay or prevent the development of 8,692 acres of future nesting and roosting habitat. This would limit recovery potential. The full restoration alternative would move the species further away from recovery objectives. For MSO, the full restoration alternative would not be compliant with the Coconino National Forest Plan or the revised MSO Recovery Plan. Because it is not compliant with the revised MSO Recovery Plan, it would not be compliant with the Kaibab Land and Resource Management Plan. In goshawk PFA/dPFA habitat, the lower residual percent max SDI range in the full restoration alternative would increase resiliency to natural disturbances. However, approximately 75 percent of nest habitat would be compromised by converting the forested environment the open landscape interspersed with individual trees or tree groups. Although goshawk habitat use is variable across its range, goshawks consistently seek larger trees and higher canopy cover for nesting. The downward trend in coarse woody debris (CWD) would not be in alignment with forest plan desired conditions for managing CWD between 3 to 10 tons per acre. The full restoration alternative would reverse the upward trend found in alternative B to a range of 0.6 to 0.8 snags > 18 per acre. The downward trend would not be in alignment with desired conditions.

Waltz, Amy	2. The ERI recommends that the Forest Service consider including additional information across the entire document to improve the consistency among the introductory sections, effects analysis,and specialists reports. Specifically, the ERI recommends adding: a. Information on the reduction in wildland firefighting costs and associated post-fire mitigation costs. Because this is identified as a concern, as well as a benefit that results from treatments in the preferred alternative, adding economic information that demonstrates the benefits of action will strengthen the document (Combrink et al. 2013 http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/D2013006.dir/doc.pdf).	(165-67) The following language has been added to the socioeconomic portion of the EIS (DEIS pg. 291): "The costs of a single large fire may greatly exceed annual wildfire expenditures listed above. The Forest Service, for instance, spent approximately $14.4 million responding to the 2010 Schultz Fire (Combrink et al 2013). Furthermore, the total cost of the Schultz Fire – including decreased property values, loss of life, cleanup, evacuation, and habitat destruction – is estimated to be between $133 million and $147 million (Combrink et al 2013). Therefore, economic benefits of 4FRI described here should be viewed as lower-bound estimates."
Waltz, Amy	b. Clarification and better quantification of scale as it relates to information displayed in desired conditions, existing conditions, and the post-treatment conditions across all specialist areas is needed. The information provided on scale currently is inconsistent, with little explanation of the linkages among scales. It is difficult to understand how things like openness, composition, structure, and tree group sizes will change across the landscape at different scales. The ERI recommends: Clarification of scale; clarification of at what scale metrics will be assessed; Definition and relationships among openness, canopy density, and canopy cover in both DEIS and specialist reports; Definition of the metric used for FVS modeling that portrayed openness, canopy density, or canopy cover post-treatment. We suggest modifications to the table below to correct the following: i. Table 142 in Appendix E of DEIS refers to a mid-scale, which is never addressed in the DEIS or specialists reports. ii. Define at what scale Desired Conditions would be assessed. iii. Increase clarity on how and why data were assessed at different scales (for example Goshawk at RU subunits, MOS at RU) in both DEIS document and specialist reports.	(165-68) The scale of analysis for each resource was in part determined by forest plan (or other) requirements. For example the scales analyzed for goshawk and old growth were driven by current Coconino NF forest plan direction. There is no analysis scale direction for MSO so a habitat-specific analysis at the RU scale was conducted. Also see our response to comment 165-3.
Waltz, Amy	The ERI recommends that the Forest Service improve the ability to compare pre- and posttreatment conditions. While much effort and space are devoted to post-treatment conditions and distributions across multiple scales and for multiple categories, metrics analyzed are inconsistent with current conditions metrics and difficult to compare. With no pre-treatment data available or presented along	(165-69) In the FEIS, additional analysis conclusions have been included for heterogeneity. For example, in the summary comparison of alternatives table (FEIS chapter 2), a heterogeneity category has been included. Metrics including percent openness or interspace (at landscape and habitat type sub-scale) and spatial arrangement have been used to describe the post-treatment condition. Also see the

	with the alternative outcomes, it's very difficult to assess what changes will occur on the post-treatment landscape. For example, table 10 and 64 (Alt C) in the Silviculture Specialist Report are pre- and post-openness conditions, but it is difficult to see the change with the current formatting. Although there is a difference from the no action Alternative A, "through time" comparisons with existing conditions will better show the degree of change from the project. The ERI recommends that the Forest Service move Table 10 values to directly above the post- treatment openness tables (for example, above Table 64, Alt C). Add current condition or starting condition information to tables 61, 62, 63, 66, 67, 68. It would also be helpful to portray a % change expected graphic.	silviculture report.
Waltz, Amy	The ERI recommends including a pre- and post-treatment map of same variable to graphically display change with treatment.	(165-70) While not in the FEIS, the silviculture report now includes detailed graphs which displays movement toward NRV by alternative (see appendix C-G). (165-71)The ability to create interspace and meet VSS guidelines is disclosed in the effects analysis. The DEIS documents a complete effects analysis for each alternative relative to the desired conditions for this project. The implementation plan (DEIS Appendix D) includes a variety of designs that utilize a "read the land" approach. For example on Pgs. 616, 619, 622, 624, 629, 632 and 634, the discussion states, "Overall, average group size would vary within this range depending on site quality, existing stand structure, and pre-settlement tree evidence". Table 139 includes guidance on placement of tree groups, interspace and regeneration openings. The placement would vary depending on existing conditions. Along with the design, Table 140 (DEIS Pg. 654) emphasizes that interspace, regeneration openings, tree group density and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (pg. 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size) and the amount of regeneration openings may be made during implementation to ensure tree group density remains outside of the "red zone" density. Also see response to comment 165- 66 as it relates to moving towards reference conditions.
Waltz, Amy	The ERI recommends that the Forest Service provide more detail on how the VSS Desired Conditions are cross-walked to ecological Desired Conditions. To address this, ERI recommends: 1. Describe the desired condition hierarchy (are VSS distributions met at the expense of forest structure and density goals that meet restoration objectives?); 2. Acknowledge limitations: the FS is limited in their ability to create interspaces and meet VSS guidelines; 3. Acknowledge loss of desired conditions that relate to historical conditions (lower understory diversity, lower habitat diversity, lower fire risk reduction); 4. Clarify how goals are dependent on starting stand conditions, and may have different desired conditions based on existing stand and different recommended prescriptions.	

Waltz, Amy	The ERI does not support the distinction of regeneration openings in ponderosa pine forests as there is little evidence for this pattern in historic reconstructions. The ERI recommends: 1. Combining desired "regeneration openings" with desired interspaces to allow a better cross-walk to ecological regeneration process, including the ability to mimic historic forest age distributions (historic regeneration rates range between 0.4 to 3.6 trees per hectare per decade (Mast et al. 1999. Restoration of Presettlement Age Structure of an Arizona Ponderosa Pine Forest. Ecological Applications 9(1): 228-239), also see Bailey and Covington. 2002. Evaluating ponderosa pine regeneration rates following ecological restoration treatments in northern AZ, USA. Forest Ecology and Management 155: 271-278). 2. A complete explanation of the concepts associated with regeneration openings as it relates to long term forest management goals would increase understanding with external partners.	(165-72) The desired conditions within goshawk habitat include a percentage of the landscape occupied by VSS 1 over time. This EIS analyzes a course of action to start moving toward the desired conditions. The detailed silvicultural prescription for each treatment unit documents how much interspace and regeneration would be needed to move towards openness and age class distribution desired conditions and it will prescribe a comprehensive course of action to accomplish those objectives including placement guidance (See table 139, DEIS Pg. 642). Table 144 (DEIS Pg. 666) lists ways in which regeneration and openness will be monitored. Table 3 in the silviculture specialist report lists modeling assumptions specific to each treatment type. Table 3 was designed to be a stand-alone explanation of the modeling assumptions for each treatment type. Table 3 describes the FVS treatment modeling assumptions by treatment type for the proposed action. Table 3 along with the listed modeling assumption for each treatment on page 11-12 appropriately articulates the modeling assumptions used for this analysis. The basic treatments that are modeled (mechanical, 2 Rx burns) are displayed in the list of assumption prior to table 3. How those modeled evaluation criteria, by treatment, are affected is disclosed in the effects analysis. These assumptions were imputed into FVS to meet the desired conditions or to be consistent with forest plan direction (unless specified in a site-specific forest plan amendment). There are limitations to the FVS model which are disclosed in the silviculture specialist report, pg. 15. With the use of FVS it is recognized that the modeling results are an average approximation of the desired forest structure. Actual stand data was used in all the FVS simulations. We state in the limitations section of the silviculture specialist report (pg. 15) "Output from the FVS model used in this analysis is a characterization of the existing condition and relative change over time of management actions or no action. Absolute conditions are neither intended nor implied". This is due to stand exam data being limited by sampling intensity and the variability within the sampled area. The FVS model along with the adjusted conditions (FFE, regeneration rates) are represented as close as possible to 'real conditions'. These conditions are based on best available science, model limitations, forest plan direction and professional opinion (modeler). For the general forest matrix, we modeled regeneration as a

		function of basal area as documented in Sorensen et. al. 2010. For the group selection acres, we modeled regeneration based on the sequence of activities and local Forest Service personnel experience with natural regeneration following similar treatments on similar sites. Prescribed fire was modeled at a fixed rate (burning and mortality) for both years with the assumption that burning conditions to represent real possible conditions for prescribe fire.
Waltz, Amy	The ERI recommends the modeling methodology be better articulated: Overall, it is difficult to understand exactly what modeling assumptions were used, and what the implications are for the results due to those assumptions. To address this we recommend: Increasing the clarity (e.g., methods section) on what are the basic treatments that are modeled (mechanical plus 2 RX burn) and how the modeled components of those treatments affect the resulting post-treatment conditions. By doing this, one can better evaluate how the modeled expected outcomes may differ from real conditions. (For example, what are the implications of modeling mortality at a fixed rate for the 2014 burn, but using FVS-FFE mortality for the 2019 burn? Regeneration rates are determined by what references? We recommend including the Puhlick 2012 Forest Ecology and Management article (Section 3.2). Also add a sentence or paragraph detailing how well FVS models growth, compared to actual growth— this should be in the model where actual stand data were used.)	(165-73) Thank you your comment The silviculture reports describes in detail the modeling used to inform the treatments on pages 12-19.
Waltz, Amy	5. The comments below refer more specifically to the Fire Effects Specialist Report. a. Pine-Sage system: There is little cited information for the Pine-Sage habitat found on the Tusayan RD. The ERI recommends addressing current pine-sage condition as discussed on page 38 of Fire Effects Specialist Report with additional data. Attached is an unpublished report (Huffman et al. 2010) from work done in 2009 on a ponderosa pine-pinyon-juniper landscape west of the Tusayan airport. Treatment (127 plots) and control (105 plots) sites were established and pre-treatment data for both sites were summarized.	(165-74) Thank you for your comments, and the paper. Originally, there was data from the TES survey of the area, but we were informed by one of the authors that the data were not representative enough to be cited in this report. We read Huffman's work, but it has little information that is specific to the pine/sage systems we intended addressing in the EIS. In the FEIS we have removed references to historic conditions.
Waltz, Amy	b. Modeling: i. Utilizing Schultz Fire conditions for modeling. While the text does define parameters and also the significance of using "conservative" fire conditions and ramifications of those, modeled	(165-75) We appreciate the opportunity to clarify the discussion and will put details back in the report that were edited out earlier for the sake of brevity. We will expand the explanation of modeling

	post-treatment fire behavior results remain “conservative,” which may have implications for attaining desired conditions. The ERI recommends: 1. A better explanation of the logic behind this scenario selection; 2. Implications of the modeling assumptions on the conclusion that “Desired Conditions of < 10% crown fire activity will be reached post-treatment”; and 3. Inclusion of modeling results from a subset of the analysis area that show the range of fire weather commonly occurring in northern Arizona, including 97th percentile conditions.	assumptions and the conclusion of <10% crown fire post-treatment. We have added columns in Table 2 of the specialists’ report that include Schultz Fire weather percentiles (as per the ROMAN weather site, and the COF weather tracking data for June 20th, 2010), as well as 97thpercentile weather parameters, as calculated by Fire Family Plus for the Flagstaff RAWS station.
Waltz, Amy	ii. The modeled scenarios are not clearly detailed. Although this information is available in Appendix A of the specialist report, it is difficult to assess what was actually modeled as the reader is examining the modeling outputs. The ERI recommends: bringing the scenarios forward, (e.g., mechanical treatments, burn one, burn two) and clearly articulating the strengths and weaknesses of the modeling process.	(165-76) We agree it will add to the clarity of the document to more clearly describes the treatments modeled and the strengths and weaknesses of the modeling. These will be added to the ‘Methodology’ section of the Fire Ecology report.
Waltz, Amy	iii. Smoke. There is a conclusion that because of prevailing winds, communities wouldn’t be impacted by smoke and that smoke will roll away from communities. It is not clear why this conclusion was reached. The ERI recommends: A better explanation that supports the conclusion, including some of the modeling assumptions. Also include level of confidence in the modeled outputs.	(165-77) There is no conclusion about smoke ‘rolling away from communities’ in the Fire Ecology/Fuels/Air Quality report. The USFS will abide by the Clean Air Act, and does not anticipate exceeding the NAAQS. This does not mean there will be no impacts, and that was not the intent of the conclusions. There would be impacts and, most likely, though the concentrations of emissions are not likely to increase, the number of days or duration of impact may increase.
Waltz, Amy	iv. Long-term impacts. It is difficult to understand how effective this will be for the long-term. The modeling assumptions do not clearly state if modeling outputs would change within x years. The ERI recommends: Include a discussion of where long-term goals of fire and fire-use will be structured if not in this DEIS. Will they be in the new forest plan? Discuss how this may or may not set the landscape up to be managed for natural ignitions.	(165-78) We will add some clarification as to the effective duration of treatments. Direction on the management and strategy of wildfires is not a part of this EIS. That direction is in the forest plans. As stated on pages 12, 129, and 230 of the Fire Ecology report, the results of the treatments proposed by 4FRI would be expected to increase the decision space for Agency administrators who make decisions on how to manage wildfires, but direction for how to make those decisions is, and will continue to be in the forest plans.
Waltz, Amy	. We understand that modeling all treatments to occur at once results in an artificial landscape. The ERI recommends: Incorporating temporal modeling effects in a subset of the analysis area. This may not require re-modeling of impacts. FlamMap burns all pixels at once to provide proportions of the landscape in each fire behavior condition. An aspatial discussion could include expectations of	(165-79) We will expand the discussion under ‘Methodology’ of the Fire Ecology report that includes some description of how some treatments will occur each year…not all at once, and some of the implications of how that relates to the modeling results presented.

	desired conditions after 50% of treatments are in place. As in comment b.ii. above, implications of this modeling assumption should also be clearly stated.	
Waltz, Amy	c. FRCC. Is a goal of FRCC 1 obtainable? The ERI recommends changing FRCC goals to an objective, and stating whether this project will or will not move the landscape toward that condition.	(165-80) We agree that FRCC1 is not obtainable during the life of this project. We have changed the desired condition that to state that overall the project area would be an FRCC3, and there would be no acres left in Vegetation Condition Class 3.
Waltz, Amy	d. Understory Response. The ERI recommends that the Forest Service include additional information in the fire effects section that documents the effects of thinning and burning on understory species. Specifically information about how the plant community species composition resulting from a wildfire may be very different than that resulting from restoration treatments. Much of the information in the report relates to information gleaned from wildfires, which may provide an overestimation of understory production, depending on the severity of the wildfire. Since some of the area is slated for burn only treatments, it is important to display how much of an increase in production can be attributed to burning the vegetation without opening up the canopy. Below are a sampling of papers and theses outlining the understory response following restoration treatments and wildfires. Many of these papers contain research from within the proposed 4FRI area and may be useful for documentation purposes. While understory vegetation may increase following restoration treatments, it can be highly variable from year to year, depending on the amount of tree canopy that has been removed and yearly variation in precipitation. Armour, C.D., Bunting, S.C., Neuenschwander, L.F., 1984. Fire intensity effects on the understory in ponderosa pine forests. J. Range Manage. 37(1), 44-49. Bailey, J.D., Speer, R.K., 2008.Understory vegetation responses to multi-aged group selection harvesting and prescribed fire in northern Arizona, in: van Riper, III, C., Sogge, M.K. (Eds.), Colorado Plateau III: Integrating Research and Resources Management for Effective Conservation. The University of Arizona Press, Tucson, Arizona, pp. 259-269. Crawford, J.A., Wahren, C.-H.A., Kyle, S., Moir, W.H., 2001. Responses of exotic plant species to fires in Pinus ponderosa forests in northern Arizona. J. Veg. Sci. 12(2), 261-268. Dodson, E.K., Fiedler, C.E., 2006. Impacts of restoration treatments on alien plant invasion	(165-81) The wildlife report focused on overstory/understory relationships with some reference to effects of “unplanned ignitions.” The analysis portion of that report used the understory index based on changes in the overstory and only mentioned that this is an underestimate because it does not include the nutrient pulse and reduction in duff & needles from fire.

	in Pinus ponderosa forests, Montana, USA. J. Appl. Ecol. 43(5), 887-897. Fornwalt, P.J., Kaufmann, M.R., Stohlgren, T.J., 2010. Impacts of mixed severity wildfire on exotic plants in a Colorado ponderosa pine–Douglas-fir forest. Biol. Invasions. 12(8), 2683- 2695. Kerns, B.K., Thies, W.G., Niwa, C.G., 2006. Season and severity of prescribed burn in ponderosa pine forests: implications for understory native and exotic plants. Ecoscience 13, 44-55. Laughlin, D.C., J.P. Roccaforte and P.Z. Fulé. 2011. Effects of a second-entry prescribed fire in a mixed conifer forest. Western North American Naturalist, 71(4):557-562. Laughlin, D.C., M.M. Moore, and P.Z. Fulé. 2011. A century of increasing pine density and associated shifts in understory plant strategies. Ecology, 92(3):556-561. Laughlin, D.C., P.Z. Fulé, D.W. Huffman, J. Crouse and E. Laliberté. 2011. Climatic constraints on trait-based forest assembly. Journal of Ecology, 99(6):1489-1499. McGlone, C.M., M. T. Stoddard, J.D. Springer, M.L. Daniels, P.Z. Fulé, and W.W. Covington. 2012.Nonnative species influence vegetative response to ecological restoration: Two forests with divergent restoration outcomes. Forest Ecology and Management, 285:195-203. McMaster, M.A., 2010. Effects of Fire and Post-fire Seeding on Plant Communities in a Ponderosa Pine Forest. Unpublished master's thesis, Northern Arizona University, Flagstaff, Arizona. Nelson, C.R., Halpern, C.B., Agee, J.K., 2008. Thinning and burning result in low-level invasion by nonnative plants but neutral effects on natives. Ecol. Appl. 18(3), 762–770. Sabo, K.E., Sieg, C.H., Hart, S.C., Bailey, J.D., 2009. The role of disturbance severity and canopy closure on standing crop of understory plant species in ponderosa pine stands in northern Arizona, USA. For. Ecol. Manage. 257, 1656-1662. Stoddard, M.T., C.M. McGlone, P.Z. Fulé, D.C. Laughlin, and M.L. Daniels. 2011. Native plants dominate understory vegetation following ponderosa pine forest restoration treatments. Western North American Naturalist, 71(2):206-214.	
Waltz, Amy	6. The following comments refer specifically to the Range Specialist Report. a. The range report states forage plants can regrow within one year. However, severe drought, such as much of the area experienced in 2002, will lead to delays in recovery following restoration treatments. According to Stevens (2004), "amount and distribution of precipitation in the Intermountain West is perhaps	(165-68) The purpose of the rangeland analysis is to describe the impacts to the range resource from the proposed treatments. The potential impacts from grazing, as it relates to individual resources, are evaluated in cumulative effects (by each resource). A system is already in place (not related to the decision to be made in this analysis) that accounts for drought conditions and adjusts the number of livestock

	one of the most important factors in determining to what degree a range improvement project succeeds or fails during the establishment period. Above-average precipitation can result in some outstanding successful projects. Projects should be planned on the basis of average yearly precipitation. Below-average precipitation during years of establishment will change post-treatment management." The ERI recommends that the USFS account for this in the document. b. The ERI recommends that the definition of range readiness, from Appendix C: "Restrictions in grazing of livestock would primarily occur after prescribed fire in a pasture. Post-fire grazing may resume within a pasture when soil and perennial plants, that would likely be grazed, would not be permanently damaged by livestock. The range management definition for this is range readiness. Plants are ready for grazing when at least one of the following characteristics is present: (1) seed heads or flowers, (2) multiple leaves or branches, and/or (3) a root system that does not allow plants to be easily pulled from the ground. These characteristics provide evidence of plant recovery, high vigor, and reproductive ability. An estimate of this restriction is not available because each pasture and burn is unique. Climatic conditions, soils, vegetation, burn intensity, burn amount, and pasture management can vary greatly from year to year" may be too qualitative and needs further refinement. Our experience from previous restoration projects is that a time period of at least two years of deferred livestock grazing following thinning and burning is warranted. Stevens (2004) recommends a period of two growing seasons for ponderosa pine and two to three years for most other ecosystems. If an area has been seeded, additional time may be required, perhaps up to three additional years, for the seeded species to establish. Periods of below average precipitation will also require additional time (see above). Stevens, R. 2004. Management of restored and revegetated sites. In: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pp. 193-198.	that are authorized to use an allotment (on an annual basis). Regarding fire, pages 573-574 of the DEIS (Rangeland Management section– row R6) includes a design feature for "restrictions" on grazing after fire to assure "range readiness". We believe there needs to be discussion of deferred grazing in allotments in anticipation of scheduled prescribed fire to allow fine fuel buildup to assure "fire readiness". Adequate fine fuels will assure that surface fire objectives should be achieved throughout the burn unit. We are adding the following sentences to clarify the "fire readiness" concern for livestock grazing to the Range section of the FEIS and Range Specialist Report tin the Common to All Action Alternative and the Livestock Grazing Impacts to Fire in Cumulative Effects sections. There is no need for pasture rest prior to prescribed burning because sufficient fuels will exist as a result of the30-40% livestock and wildlife utilization guideline applied throughout the analysis area. Pastures may be rested prior to prescribed burning, in coordination with range specialists, but it is not a requirement to reach burning objectives.
Waltz, Amy	7. The following comments refer specifically to the Botany Specialist	(165-83) Review and analyses of these articles: Gundale et al. 2008:

Report: a. The ERI recommends that the botanist's specialist report add in recommendations to areas that have been invaded by cheatgrass (Bromus tectorum) (and see Stevens 2004). These areas may require additional treatments following fire, as well as deferred livestock grazing, since it has been demonstrated that fire promotes the spread and establishment of cheatgrass. We would also ask that the decision to burn these cheatgrass infested areas be carefully weighed against the benefit of fuel reduction and other resource benefits of burning. Gundale, M.J., Sutherland, S., DeLuca, T.H., 2008. Fire, native species, and soil resource interactions influence the spatio-temporal invasion pattern of Bromus tectorum. Ecography 31, 201-210. Keeley, J.E., McGinnis, T.W., 2007. Impact of prescribed fire and other factors on cheatgrass persistence in a Sierra Nevada ponderosa pine forest. Int. J. Wildland Fire 16(1), 96–106. 30. McGlone, C.M., Hull Seig, C., Kolb, T.E., 2011. Invasion resistance and persistence: established plants win, even with disturbance and high propagule pressure. Biol. Invasions. 13, 291-304. McGlone, C.M., Springer, J.D., Laughlin, D.C., 2009a. Can pine forest restoration promote a diverse and abundant understory and simultaneously resist nonnative invasion? For. Ecol. Manage. 258, 2638-2646. McGlone, C.M., Springer, J.D., Covington, W.W., 2009b. Cheatgrass encroachment on a ponderosa pine forest ecological restoration project in northern Arizona. Ecol. Rest. 27(1), 37-46. Sorensen, C.D., McGlone, C.M. 2010. Ponderosa pine understory response to short-term grazing exclusion (Arizona). Ecological Restoration, 28(2): 124-126

This study was conducted in Montana and is documented in a peer-reviewed journal. The study was conducted in a bunchgrass/ponderosa pine community where ponderosa pine trees were solitary or occurred in low density and distributed in grassy areas. The study consisted of three components, a field study, a greenhouse study and a germination study. The field study sites were on the edges of a large wildfire that had occurred five years prior to the beginning of the experiment. The greenhouse study assessed the effects of nutrient limitations on cheatgrass and a germination study used extracts from pine litter on the germination of cheatgrass in a laboratory setting to study the effects of the presence of ponderosa pine litter on cheatgrass germination. On the study site cheatgrass occurred in two types of infestations after burning – 1) as a ring of infestation around the base of the ponderosa pine tree. These persisted for 5-10 years and diminished over time in the absence of fire or 2) as low to moderate infestations in the bunch grass community both before and after fire. The authors found two different mechanisms regulating the infestations; one mechanism for trees and one for grassy areas. There is a strong interaction between fire disturbance and cheatgrass under trees but not in grassy areas. Findings included a strong relationship between added nitrogen from burning at the bases of the trees. Factors influencing this relationship include the increases of nitrogen and phosphorus after fire consumed the pine litter. In the greenhouse and germination studies, cheatgrass germination and growth were suppressed by the presence of pine litter. Analysis: This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. We acknowledge that resources including nitrogen and phosphorus will increase and litter will decrease after burning is conducted, increasing the risk of noxious or invasive weeds invasions. The site conditions (open ponderosa pine/bunch grass areas) are limited or non-existent in the project area. Instead, much of the area to be treated is comprised of dense ponderosa pine stands with little or no understory vegetation. Understory vegetation is expected to increase after treatments. The presence of cheatgrass as well as other noxious or invasive weeds could negatively affect the post treatment understory plant community. To mitigate these effects we plan to survey and treat noxious or invasive weeds prior to the implementation of management

activities in the units to be treated. See appendix E of the DEIS (page 569), design criteria B 15 and B16 for features addressing the survey, treatment and prevention of noxious or invasive weeds. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment , providing specific language and trigger points for cheatgrass infestations. It states that if cheatgrass increases above the pre-treatments level, treatment in adjacent high risk areas will be discontinued until an alternative approach is developed. The Four Forest Restoration Initiative would also incorporate the NEPA decisions and treatment strategies in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005). Conclusion: There is no conflict between science used in this article and the science we used for our analysis. Keeley and McGinnis (2007): Keeley and McGinnis conducted a study on cheatgrass invasions in the Kings Canyon National Park, California in a ponderosa pine community. Ponderosa pine was the dominant tree but incense cedar and two species of oaks were also present. The understory was comprised of various grasses, forbs and shrubs including manzanita, suggesting a lower elevation or different plant community than is present locally. The cheatgrass invasions were thought to have been introduced by prescribed fire in the park in the 1990's and the prescribed burning program was halted until the problem could be assessed. The authors used a series of variable including fire intensity, cover, shade, biomass and season of burning to measure the results of the burning experiments. They also added nutrients to the soils in some treatments. In one experimental treatment, pine needles were added to the burned area to assess the effects of them on cheatgrass germination and persistence. The authors discussed the historic fire regimes and concluded that the area burned about every 11 years. They also noted that in the pre-European era native plant communities were free from competition from non-native invasives such as cheatgrass, which can affect fire interval and intensity. Fire and livestock were thought to play an important role in the introduction and dispersal of cheatgrass in the area. In their study, the only successful treatment of cheatgrass was the pine accumulation treatment. Analysis: This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. The plant

community is dominated by ponderosa pine but is slightly different than the local plant communities within the 4FRI area. The major conclusion of this study is similar to Gundale et al (2008) where pine litter suppressed cheatgrass germination and growth. We anticipate that pine litter would be reduced or removed from the units that receive burning treatments in the 4FRI area but would increase over time due to natural processes. We plan to survey and treat noxious or invasive weeds prior to the implementation of management activities in the units to be treated. Adaptive management and additional treatments would be used if needed to address the effects of noxious or invasive weeds. See appendix C of the DEIS (page 569), design criteria B 15 and B16 for features addressing the survey, treatment and prevention of noxious or invasive weeds. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment , providing specific language and trigger points for cheatgrass infestations. It states that if cheatgrass increases above the pre-treatments level, treatment in adjacent high risk areas would be discontinued until an alternative approach is developed. The Four Forest Restoration Initiative would also incorporate the NEPA decisions and treatment strategies in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005).Grazing was mentioned in this article. Design criteria R6 (page 578; Appendix C) addresses post-fire assessment of soil and perennial plants prior to grazing. Conclusion: There is no conflict between science used in this article and the science we used for our analysis We are proposing no change to the analysis or mitigations at this time based on this article. Our analysis is sufficient and no change is needed in the FEIS. McGlone, Hull-Sieg, and Kolb 2011: This article documents a follow-up study conducted by McGlone at a restoration site near Mount Trumbull, AZ. Previous articles prepared by McGlone and various co-authors documented a high level of invasion of cheatgrass on the restoration units after treatments including tree removal and burning occurred. The treatments reduced the total tree density by nearly one-half and the total basal area by more than one third. Commercial timber was removed and the remaining slash was lopped and scattered (Roccaforte et al, 2010). Following the treatments, McGlone noted the high level of invasion. This study

revisited the restoration units for a study on native plant competition. The authors used a reciprocal seeding study and a clipping study to assess native plant competition. The studies included replicated areas where native species were seeded in cheatgrass infestations and where cheatgrass was seeded into native plant dominated areas. The authors also conducted a clipping study to assess the effects of biomass removal on cheatgrass. The hypotheses for the reciprocal seeding study was that disturbance to the native plant area would reduce the resistance to invasion; and that disturbance to the cheatgrass dominated area would reduce its resistance to invasion. At the end of the study, the cheatgrass dominated areas remained dominated by cheatgrass and the native species dominated areas remained dominated by native species. The study lasted for three years. The authors noted some shifts in plant community over the course of the study but no significant changes. Squirrel tail (Elymus elymoides) a perennial native grass was one of the seeded species and was present in the native plant community before seeding. It remained a dominant species in the native plant areas after the experiment. Cheatgrass remained dominant in the previously infested areas. Analysis: This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. It revisited a previous location addressed in the comments submitted by ERI. The study area is in northern Arizona and is generally similar to the areas included in the 4FRI analysis. The authors were unable to prove the hypotheses they developed but had some positive results in the seeding study. The species they used in their seed mix have been reported elsewhere as potential species for native plant restoration and competition with non-native species. Mitigations for noxious or invasive weeds are included in appendix C of the DEIS and will be carried forward into the final document. Refer to design criteria B13 on page 568 of the DEIS: "Manage prescribed burns to promote native species and to hinder weed species germination". The purpose of this design feature is to "promote healthy native plant communities and reduce the risk of noxious or invasive weed invasions." The soil and watershed section of Appendix C also contains several provisions for seeding disturbances caused by management actions. Appendix E would provide monitoring and feedback for management actions and adaptive management including the understory herbaceous community

and noxious or invasive weeds. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment , providing specific language and trigger points for cheatgrass infestations. It states that if cheatgrass increases above the pre-treatments level, treatment in adjacent high risk areas would be discontinued until an alternative approach is developed. We referred to John P. Roccaforte, Peter Z. Fule´ and W. Wallace Covington. 2010. Monitoring Landscape-Scale Ponderosa Pine Restoration Treatment Implementation and Effectiveness. Restoration Ecology. Vol 18 (6). Pages 820–833 to help us understand the treatments at the study site. Conclusion: There is no conflict between science used in this article and the science we used for our analysis. We are proposing no change to the analysis or mitigations at this time based on this article. Our analysis is sufficient and no change is needed in the FEIS. McGlone, Springer and Laughlin 2009: This article is based on the restoration experiments conducted at Mt. Trumbull as in the article above. The restoration experiments focused on the reduction of the risk of crown fire and to increase the native understory and species diversity. Treatments included tree removal and prescribed fire to simulate pre-settlement conditions. Merchantable timber was removed and the remaining slash was scattered. Slash was disposed of by broadcast burning. Slash accumulations on some portions of the restoration units was ample enough to cause high severity fire, high soil heating and tree mortality in some portions of the restoration treatments. No seeding of understory species occurred as part of the initial restoration study. This study evaluated the magnitude and direction of the understory vegetation change for the first five years after treatments. The pre-treatment data detected low species diversity in the herbaceous plant community as compared to the surrounding area. Recovery of the native plant community was potentially compromised by the impoverished seed bank and the presence of seed sources for noxious or invasive weeds. Plant communities with low species diversity have been shown to be more easily invaded than those with greater diversity. The presence of cheatgrass in the pretreatment community could have contributed to the invasion. There was a major drought during the study. The authors postulated that drought in the summer of 2002 followed by rain events

in September 2002 could have contributed to the increase in cheatgrass. Cheatgrass tends to germinate in the early fall and then overwinters and matures in the following growing season. The rain event would have corresponded to this cycle. Cheatgrass was additive to the native plant community, did not displace the native plant community. Even with cheatgrass invasion, native plant community continued to increase through 2005 (end of study). Analysis: This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. It was part of a restoration study conducted near Mt. Trumbull, AZ. The study area is in northern Arizona and is generally similar to the areas included in the 4FRI analysis. Mitigations for noxious or invasive weeds are included in appendix C of the DEIS and will be carried forward into the final document. Refer to design criteria B13 and B15 on page 568 of the DEIS. The soil and watershed section of Appendix C also contains several provisions for seeding disturbances caused by management actions. Appendix E will provide monitoring and feedback for management actions and adaptive management including the understory herbaceous community and noxious or invasive weeds. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment , providing specific language and trigger points for cheatgrass infestations. It states that if cheatgrass increases above the pre-treatments level, treatment in adjacent high risk areas will be discontinued until an alternative approach is developed. Conclusion: There is no conflict between science used in this article and the science we used for our analysis. We are proposing no change to the analysis or mitigations at this time based on this article. Our analysis is sufficient and no change is needed in the FEIS. McGlone, Springer and Covington, 2009: This article is based on the restoration experiments conducted at Mt. Trumbull as in the article above. The authors discuss the increase in cheatgrass that occurred in 2003. Cheatgrass increased in all treatments but was highest in the thin/burn treatments. They cite several factors that could have contributed to the increase in cheatgrass. In this article the authors discuss the severe drought that occurred over the course of the year between August 2001 and August 2002 followed by precipitation in September 2002. This series of events contributed to stress to native species followed by ideal

growing conditions for the cheatgrass in September 2002which would have facilitated the invasion. The year of burning seemed to have no effect on whether the individual sites were invaded. Cattle were allowed to re-enter the area after a four year absence but the increase in cheatgrass could not be directly attributed to grazing. The historic grazing use in the area was much higher than the stocking allowed in the area in 2002 or 2003. The restoration treatments were seeded but the authors stated that the seeding was not heavy enough to suppress noxious or invasive plant invasions. The authors mentioned that cheatgrass could have been present in the seeding mix.
Similar cheatgrass infestations were observed in other areas of the region including some areas that were not recently treated or burned. The authors include six recommendations in their article : Isolate areas containing non-native species from further disturbance, Reduce population size of non-natives prior to implementing the treatments, Limit post treatment seeding to areas already containing non-natives, Minimize disturbance on the landscape, Do not conduct ecological restoration treatments during droughts or other climatic conditions that may compromise the success of the project, and, Conduct long-term post-treatment monitoring and aggressively control nonnative population expansion. Analysis: This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. It revisited a previous location addressed in the comments submitted by ERI. The study area is in northern Arizona and is generally similar to the areas included in the 4FRI analysis. The concerns above are addressed in the same order in which they appear above. We cannot completely avoid the areas infested with non-native species from further disturbance and still accomplish the goals of restoration and fuels reduction. However, there are several mitigations that would help minimize the spread of noxious or invasive weeds and would provide for control of then before implementation begins. For example design criteria B13, B15 and B16 (pages 569 -570 of Appendix C) provide for noxious weed mitigation to botanical resources and survey and control of noxious or invasive weeds prior to implementation. There are several design criteria in other resource areas that also address noxious or invasive weeds (see the soil and watershed and transportation sections of Appendix C). Infestations would be reduced using design

criteria B15.There are many instances where it may be necessary to seed the area for resource protection including the prevention or control of noxious or invasive weeds (see soil and watershed section of Appendix C). Native seed that has been certified weed free would be used in these instances. Levels of disturbance would vary depending on treatments designed for a specific area. There are much mitigation incorporated throughout the document and Appendix C that would address and minimize the level of disturbance as much as possible while still accomplishing the goals of restoration and fuels reduction. It would be unlikely that timber harvest or prescribed fire would occur during a severe drought. Fire danger on national forest lands would likely be extreme if this were to occur. Timber harvesting and prescribed fire would be severely limited or halted during times of high fire risk. 4FRI includes a long-term monitoring plan for many resources including noxious or invasive weeds and provisions for adaptive management to address issues with noxious or invasive weeds. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment , providing specific language and trigger points for cheatgrass infestations. It states that if cheatgrass increases above the pre-treatments level, treatment in adjacent high risk areas would be discontinued until an alternative approach is developed. Conclusion: There is no conflict between science used in this article and the science we used for our analysis. We are proposing no change to the analysis or mitigation sat this time based on this article. Our analysis is sufficient and no change is needed in the FEIS.
Sorenson and McGlone 2010: This article is based on the restoration experiments conducted at Mt. Trumbull as in the articles above. It assessed the effects of cattle grazing on the cheatgrass infestation. The authors established ten paired plots consisting of a grazing treatment exclosure and a similarly sized grazed control. Of the ten pairs, five were located in a thinned and burned forest and five in unrestored areas. The study area is in northern Arizona and is generally similar to the areas included in the 4FRI analysis. It utilized the cattle and grazing regime of an existing BLM allotment. The authors noted that grazing intensity and duration were light, making it difficult to detect significant change. No statistically significant trends for the utilization of native perennial grasses were detected. The authors

attributed this to the highly variable precipitation during the three years of the study. However, the authors state that grazing facilitated cheatgrass persistence during the life of the study. Analysis: This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. It revisited a previous location addressed in the comments submitted by ERI. The vagaries of the weather as well as cattle use on the area made it difficult to detect any significant changes on the study. Design criteria R6 (see page 578 of Appendix C) addresses range readiness after the implementation of prescribed fire on 4FRI treatment areas. This mitigation would allow for assessment of plant readiness and grazing. Additionally, the annual operating instructions for each allotment would be used to regulate and restrict grazing if necessary. Noxious or invasive weed issues would use the design criteria discussed in the articles above. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment , providing specific language and trigger points for cheatgrass infestations. It states that if cheatgrass increases above the pre-treatments level, treatment in adjacent high risk areas would be discontinued until an alternative approach is developed. Conclusion: There is no conflict between science used in this article and the science we used for our analysis. We are proposing no change to the analysis or mitigations at this time based on this article. Our analysis is sufficient and no change is needed in the FEIS.
Stevens, R. 2004: This article is a chapter from a General Technical Reference. It addresses the management of post-treatment vegetation to ensure the success of the treatments. The author notes that the success of widely used species may vary from site to site and is partly dependent on precipitation, which will affect the outcome. Success in dry years is much harder to achieve than in years with ample precipitation. Treatment in below average years affects the post-treatment management of the site. There are several factors including wildlife and weather that cannot be controlled by the range manager. Human and livestock activities can positively or negatively affect the results and must be regulated to ensure success. Grazing plans need to be flexible enough to allow for non-use or reduced use if necessary. The authors recommend no grazing until the end of the second growing season. However, many factors should be considered including

precipitation before the treatment, vegetation type, site preparation, wildlife present and the presence and quantity of competing weedy species. Season of grazing should be considered. Grazing in spring and early summer can be damaging to recently planted sites when plants are young. The author states that intensity of grazing during the establishment period needs to be adjusted on a season to season basis based on plant phenology, as well as climatic and biotic influences. Sites with aggressive annuals such as cheatgrass may need special attention. Seeded and native species tend to develop more slowly in the presence of these aggressive annuals compared to sites where they are absent. Most annuals are never completed eliminated from a site. They remain on site and increase when the plant community is weakened. Analysis: This article is part of a general technical reference prepared for guidance on grazing management. General technical references are peer reviewed but not refereed publications as compared to journal articles but based on sound science. This article was submitted as a comment on cheatgrass. We recognize that cheatgrass would remain part of the plant community on any given site once it enters the site. Other articles above document the importance of a healthy perennial plant community to help regulate and control cheatgrass. Design criteria as well and monitoring and adaptive management are included in the 4FRI analysis to help mitigate the effects of cheatgrass invasions. Design criteria R6 (see page 578 of Appendix C) addresses range readiness after the implementation of prescribed fire on 4FRI treatment areas. This mitigation would allow for assessment of plant readiness and grazing. Additionally, the annual operating instructions for each allotment would be used to regulate and restrict grazing if necessary. Design criteria B13, B15 and B16 (pages 569 -570 of Appendix C) provide for noxious weed mitigation to botanical resources and survey and control of noxious or invasive weeds prior to implementation. There are several design criteria in other resource areas that also address noxious or invasive weeds (see the soil and watershed and transportation sections of Appendix C). Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment, providing specific language and trigger points for cheatgrass infestations. It states: that if cheatgrass increases above the pre-

	b. The ERI recommends that Table 14 (page 96-97 of the Botanist Report) be roughly ranked using the Invasive Species Assessment Protocol: http://www.natureserve.org/getData/plantData.jsp, which evaluates invasive species based on their impact to biodiversity. Or as an alternative, rather than ranking them in order, it might be more useful to have low, medium, and high impact categories, since individual species impacts can change temporally and geographically. Also for the descriptions of individual species (starting on page 109), we recommend ordering these within the document in the same way as the table on pages 96-97. We recommend including fire and/or thinning effects on each individual species from Fire Effects Information System (FEIS) database, where available. Some descriptions in the report contain this information for each species and some don't. If information is unavailable, then that would be	treatments level, treatment in adjacent high risk areas will be discontinued until an alternative approach is developed. (165-84) There is two different ranking systems in the Botany Specialist's report. The table referred to on pages 96-97 comes directly from the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests (FEIS) (2005). The FEIS includes a numerical ranking system for the species we addressed. The order of the narratives in Botany Report reflects ranking of the weeds as they are addressed in the noxious weed FEIS. It is based on lifecycle of the species and the perceived difficulty of control. We regret any confusion. A partner-working group provided the "high, medium, low" ranking. We did not use the Nature Serve system and prefer not to change our ranking at this time. The ranking and assessment of weed species as reflected in the order of the narratives comes directly from the noxious weed FEIS, which has been incorporated into both the Coconino and Kaibab NF plans by amendment (amendment 20 of the CNF plan and amendment 7 of the KNF plan). We acknowledge the threat to biodiversity by non-native species including weeds. The 4FRI analysis incorporates measures to conserve biodiversity on the forests. Biodiversity is identified in the purpose and need (page 8 of the DEIS). Specifically "The project is expected to move almost 600,000 acres toward comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects". Biodiversity is incorporated into the definition of heterogeneity for the project. Page 345 of the DEIS states "Heterogeneity – For the purposes of this analysis, heterogeneity refers to having biodiversity in terms of habitat and forest structure across the landscape". Table 144 in Appendix E uses biological diversity as one of the major factors for landscape effectiveness monitoring (see page 666 of the DEIS). We consulted the Fire Effects Information System for each noxious or invasive weed species and updated our narratives to reflect the changes needed.
Waltz, Amy	useful to state as well. c. The ERI recommends adding in the following information by plant species, in the Botanist Report: 1) Leafy spurge -Pg. 114 – Please	(165-85) Leafy Spurge: We consulted the Fire Effects Information System (FEIS). There are data that support use of prescribed fire in combination with herbicide to control leafy spurge. Gucker (2010) (FEIS)
Waltz, Amy	clarify the statement: "If pretreatment and avoidance are not	

possible, then the locations and sites containing leafy spurge should be avoided." -Pg. 115 – The second paragraph mentions that units containing leafy spurge are slated for burn only treatments. Because fire has the potential to lead to an increase in density of this species, we recommend distinct language indicating that areas containing this species should not be burned. - Fire effects are not well documented but the only known location in the treatment units is slated for burning only (p. 118). We recommend that this area not be burned. According to the FEIS database entry for Cardaria sp., "When planning a prescribed burn, pre-inventory the project area to evaluate cover and phenology of any hoary cress or other invasive plants present on or adjacent to the site, and avoid ignition and burning in areas at high risk for hoary cress establishment or spread due to fire effects. Avoid creating soil conditions that promote weed germination and establishment. Areas of soil disturbance (e.g. those brought about by fire suppression activities) are especially susceptible to invasive plant establishment. Weed status and risks must be discussed in burn rehabilitation plans." http://www.fs.fed.us/database/feis/plants/forb/carspp3/all.html#FIRE ECOLOGY – Date accessed 5/13/13.

discussed the effects of fire on leafy spurge. The species is a geophyte with deep underground rhizomes that allow the plants to regenerate after above ground portions are killed. Leafy spurge recolonizes burned sites from both on-site sources and off-site seeding. Leafy spurge seeds present on a burned site may be killed by fire. Leafy spurge will likely increase on burned sites, but successful treatment of the area with herbicides has been reported in other areas. Gucker reports that fire alone does not control leafy spurge but positive results can be obtained when used in conjunction with herbicide treatment or biological control insects. Burning followed by herbicide treatment within two to three weeks after burning has been successful elsewhere. Locally, the most success treatment with herbicide has been in the fall as the plants senesce. Plant senescence varies from year to year depending on growing conditions. This would make the timing of the burn/herbicide treatment difficult to predict from year to year and would require on the ground monitoring and local coordination. Timing of prescribed fire is also critical for the survival of the biological control insects (Aphthona spp.) that have been released on several sites on the forest. Burning in established insect release areas while the insects are active may negatively affect them. Insects are generally active from mid-May to mid-August (Gucker, 2010). Timing restrictions for insects during this time period are not anticipated to conflict with prescribed fire objectives. Mid-May through mid-August is generally a time of high fire risk on the forest and prescribed fire would not be implemented in these conditions. We are not proposing excluding fire from areas containing leafy spurge. Instead, timing of burning and herbicide application in areas with leafy spurge will be determined by the District Fuels Specialist and District Weeds Coordinator at the time of implementation. Sites and locations of areas containing leafy spurge where burning will occur will be included in the Botany Specialist's report. However, the most current data available should be used at the time of implementation. Two design criteria are needed to address this issue Fire should be excluded from leafy spurge areas where biological control insects for leafy spurge are active during the summer months generally from mid-May to August, except if monitoring and surveys fail to detect the presence of the biological control insects. Prescribed fire may be implemented during that time if the insects are absent from the

		site and there are no other resource concerns. Monitoring prior to implementation would be needed to confirm the presence/absence of the insects. Timing of prescribed fire and herbicide application in areas with leafy spurge will be determined by the District Fuels Specialist and District Weeds Coordinator at the time of implementation. The most successful herbicide treatments for populations of leafy spurge on the Coconino National Forest have been in the fall. However, the logistics of treating plants with herbicide in the fall after burning may be difficult. The above ground portions of the plants will be absent and resources would have been drawn into the underground storage structures of the plants. A spring herbicide treatment following a fall burn may be necessary to address help facilitate control but this issue will be addressed on a site specific basis. White Top: The area containing the white top infestation has been inventoried several times already during the detection and treatment of it. Design criteria B15 in Appendix E (page 570 of DEIS) requires that all areas be surveyed and treated again before implementation.
Waltz, Amy	2) Camelthorn -Pg. 119 mentions that locations are listed in Appendix B, but no Appendix B is included in the document. -Our current knowledge of the effects of fire on this species should be included, since the report mentions that some infestations are in areas slated for burning. -There is no information on this species in the FEIS database. However, the California Invasive Plant Council mentions that: Plants may re-sprout from roots left behind after mechanical removal, and the roots are stimulated to re-sprout by fire. http://www.calipc. org/ip/management/plant_profiles/Alhagi_maurorum.php - date accessed 5/13/13. - Prescribed burning is not recommended for camelthorn control (from the Field Guide for Managing Camelthorn in the American Southwest - http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410108.pdf)	(165-86) We found Appendix B (weed locations) and checked to make sure it included camelthorn locations. The information from the California Invasive Plant Council is useful and CalIPC is a respected organization. However, the paragraph presented has no reference and no mention of experimental analyses. There is no indication that it was peer reviewed or refereed. Therefore, we cannot give it as much weight in consideration as we would a peer reviewed article or a website such as Fire Effects Information System that provides documentation for the discussion of the species. So we did not include the information from California Invasive Plant Council in our revision of this report. We could not find this publication at the link provided so could not review the information.
Waltz, Amy	3) Russian Knapweed -See comment in previous entry regarding Appendix B. The ERI could not find current information on the treatments proposed for the infested area of three acres (mentioned on p. 121). -What are the effects of fire? There is little documented information on the FEIS website, but the following information is	(165-87) We found Appendix B (weed locations) and checked to make sure it included Russian knapweed locations. Zouhar (2001) prepared an abstract for the Fire Effects Information System database. However, at that time there was no definitive information on the response of Russian knapweed in the post-fire community. Based on its life form the

	provided: “When planning a prescribed burn, pre-inventory the project area and evaluate cover and phenology of any Russian knapweed present on or adjacent to the site, and avoid ignition and burning in areas at high risk for Russian knapweed establishment or spread. Avoid creating soil conditions that promote weed germination and establishment. Discuss weed status and risks in burn rehabilitation plans. To prevent infestation, re-establish vegetation on bare ground as soon after fire as possible, using either natural recovery or artificial techniques as appropriate to site conditions and objectives. When reseeding after wildfires and prescribed burns, use only certified weedfree seed. Monitor the burn site and associated disturbed areas after the fire and the following spring for emergence of Russian knapweed, and treat to eradicate any emergent Russian knapweed plants. Regulate human, pack animal, and livestock entry into burned areas at risk for weed invasion until desirable site vegetation has recovered sufficiently to resist weed invasion. Additional guidelines and specific recommendations and requirements are available.” -The ERI recommends to avoid burning infested areas. 4) Dalmatian toadflax -This species is widespread throughout the forest and it would seem that avoiding burning treatments in infested areas would be unwieldy. -There are at least three local papers that document the effect of burning (wildfire and prescribed) on this species that should be incorporated into the entry for this species. Dodge and Fule 2008 (Leroux Fire) - http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH88c4.dir/doc.pdf Stoddard et al. 2008 (Fort Valley Experimental Forest restoration plots) http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH01a7/a40955ae.dir/doc.pd f Stoddard et al. 2011 (Fort Valley Experimental Forest restoration plots) 10 http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH32da.dir/doc.pdf McGlone et al. 2012 (Fort Valley Experimental Forest restoration plots http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH4411.dir/doc.pdf	underground portions of the plant would likely survive fire (Pyke et al, 2010). The plant would reproduce from underground sprouting in the post-fire community. We do not anticipate the need for a burn rehabilitation plan for 4FRI treatments. The remaining concerns addressed in this comment are mitigated through the design features in Appendix C of the DEIS or through the incorporation of the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests (2005). (165-88) This study is scientifically sound and is peer reviewed and refereed giving credence to its findings. The research is based on local conditions. It was conducted within a wildfire and gives insight to the introduction and cyclic nature of toadflax infestations. One of the goals of the 4FRI project is to reduce the risk of wildfire and therefore reduce the risk of scenarios similar to the Leroux Fire. Design Features B13, B15 and B16 in Appendix C of the DEIS were designed to mitigate the effects of noxious or invasive weeds in the project area. These features will be included in the final EIS. Design criteria B13, B15 and B16 (pages 569 - 570 of Appendix C) provide for noxious weed mitigation to botanical resources and survey and control of noxious or invasive weeds prior to implementation. There are several design criteria in other resource areas that also address noxious or invasive weeds (see design feature FE10 and the soil and watershed and transportation sections of Appendix C). Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment. There is no conflict between science used in this article and the science we used for our analysis. The study was conducted in a local
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		wildfire where fires severity was high. This article (Stoddard et al.) is part of a conference proceedings published by Rocky Mountain Research Station. This article was peer reviewed but not refereed publications as compared to journal articles. It is based on sound science. The article provides good information on forest restoration and non-native weeds. We did not find any mention of Dalmatian toadflax in this article. Design criteria B13, B15 and B16 (pages 569 -570 of Appendix C) provide for noxious weed mitigation to botanical resources and survey and control of noxious or invasive weeds prior to implementation. There are several design criteria in other resource areas that also address noxious or invasive weeds (see the soil and watershed and transportation sections of Appendix C). Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment. There is no conflict between science used in this article and the science we used for our analysis.
Waltz, Amy	5) Musk thistle -Pg. 123 – The existing condition paragraph also includes information on Scotch thistle. It is not clear whether this information applies to musk or Scotch thistle. - Fire adaptations (from FEIS): “Musk thistle can produce abundant seed and establish well in high light environments (see Successional Status). Fire creates conditions that are favorable to the establishment of musk thistle (i.e. open canopy, reduced competition, areas of bare soil), so if musk thistle seeds are present and competition minimal, musk thistle may be favored in the post-fire community “(From FEIS database - http://www.fs.fed.us/database/feis/plants/forb/carnut/all.html#FIRE ECOLOGY – Date accessed 5/14/13). The evidence for whether fire can be used to control musk thistle is conflicting and probably site-dependent. -McGlone et al. 2012 (Fort Valley Experimental Forest restoration plots) contains some data on musk thistle in a restoration research site in the 4FRI area. http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH4411.dir/doc.pdf	(165-89) We separated the discussion of musk thistle and Scotch thistle in our updated specialist's report to clarify our discussion. We already included information from the Fire Effects Information System in our analysis. We cited the reference as Zouhar, 2002 who is the author of the abstract for musk thistle in Fire Effects Information System. This information was accessed in 2012 during the preparation of the Botany Specialists Report. We noted that McGlone et al, 2012 detected musk thistle in the post treatment vegetation assessment at Fort Valley when we reviewed the publication for the comment on Dalmatian toadflax and urge prompt control of this species in the experimental area if it has not already been removed.
Waltz, Amy	6) Scotch thistle -Although the FEIS database does not contain information on fire effects, there should be a number of other available sources on-line. Fire will likely provide conditions conducive to the establishment of Scotch thistle populations. -McGlone et al.	(165-90) We will update the Botany Specialist Report to acknowledge there is no information available in the Fire Effects Information System database for Scotch thistle and agree that fire will provide favorable conditions for the establishment of Scotch thistle as well as other

	2012 (Mt. Trumbull) contains some data on Scotch thistle presence in a restoration research site outside of the 4FRI area but in northern Arizona. http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH4411.dir/doc.pdf	noxious or invasive weeds. Design criteria B13, B15 and B16 (pages 569 -570 of Appendix C) provide for noxious weed mitigation to botanical resources and survey and control of noxious or invasive weeds prior to implementation. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment. We noted that McGlone et al, 2012 detected Scotch thistle in the post treatment vegetation assessment at Mount Trumbull when we reviewed the publication for the comment on Dalmatian toadflax and urge prompt control of this species in the experimental area if it has not already been removed. There is no conflict between science used in this article and the science we used for our analysis.
Waltz, Amy	7) Bull thistle -The following papers contain information on bull thistle presence following ecological restoration treatments in the 4FRI area: - Stoddard et al. 2008 (Fort Valley Experimental Forest restoration plots) http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH01a7/a40955ae.dir/doc.pd f -Stoddard et al. 2011 (Fort Valley Experimental Forest restoration plots) http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH32da.dir/doc.pdf -McGlone et al. 2012 (Fort Valley Experimental Forest restoration plots http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH4411.dir/doc.pdf -The ERI has unpublished information indicating that bull thistle is present following thinning treatments alone, without the addition of prescribed burning. Other unpublished data seem to indicate that bull thistle becomes only a minor presence in the aboveground vegetation approximately 3-5 years following burning. However, seeds are probably still present in the soil seed bank for a time.	(165-91) Stoddard et al 2011 noted that 12% of the plots on the Fort Valley restoration project contained bull thistle in 2001 and decreased slightly to 10% in 2002 and was never significant enough to become an indicator species. McGlone et al, 2012 detected bull thistle on vegetation plots at Fort Valley in 2011. The species was present in control as well as the treated areas supporting part of the next portion of the comment that burning is not necessary to produce bull thistle infestations. We urge follow up visits to the location to monitor this infestation and treat it if necessary. Other portions of this comment citing unpublished data are likely valid but were not supported by documentation so are not responded to in this analysis. Design criteria B13, B15 and B16 (pages 569 -570 of Appendix C) provide for noxious weed mitigation to botanical resources and survey and control of noxious or invasive weeds prior to implementation. Table 145 (see page 675 of DEIS) in the monitoring plan provides for effectiveness monitoring for noxious or invasive weed treatment. There is no conflict between the science used in these articles and the science we used for our analysis.
Waltz, Amy	8) Diffuse knapweed -The effects of fire on this species are unknown, according to FEIS, and, “When planning a prescribed burn, inventory the project area and evaluate the cover and phenology of any diffuse knapweed present on or adjacent to the site, and avoid ignition and burning in areas at high risk for diffuse knapweed establishment or spread due to fire effects. Avoid creating soil conditions that promote weed germination and establishment. Discuss weed status and risks in burn rehabilitation plans.”	(165-92) We included fire effects information from Fire Effects Information System database in our preparation of the Botany Specialist’s Report. We cited the reference as Zouhar, 2001 who is the author of the abstract for diffuse knapweed in the Fire Effects Information System database. We do not anticipate the need for a burn rehabilitation plan for 4FRI treatments. There is no conflict between science used in this article and the science we used for our analysis.

	(http://www.fs.fed.us/database/feis/plants/forb/cendif/all.html#FIRE ECOLOGY – Date accessed 5/14/13). 9) Cheatgrass -In addition to the 2009 McGlone article cited in the report, the following papers also describe the occurrence and abundance of cheatgrass at Mt. Trumbull and at Fort Valley following restoration treatments. - Stoddard et al. 2008 (Fort Valley Experimental Forest restoration plots) http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH01a7/a40955ae.dir/doc.pd f -Stoddard et al. 2011 (Fort Valley Experimental Forest restoration plots) http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH32da.dir/doc.pdf -McGlone et al. 2012 (Fort Valley Experimental Forest restoration plots http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH4411.dir/doc.pdf	
Waltz, Amy	8. The following comments are specific to Appendix E: Adaptive Management and Monitoring, and replicate the comments submitted by the 4FRI Stakeholders. a. Discussion of Concern: The ERI agrees with the concerns and recommendations identified by the 4FRI Stakeholder Group. We reiterate those comments here: The ERI appreciates and supports the important role given to monitoring and adaptive management in the DEIS, as outlined in Appendix E (Alternative B Through D Monitoring and Adaptive Management Plan), and the important role given to implementation checklists in the DEIS, as outlined in Tables 112 to 115 in Appendix D (Alternative B Through D Implementation Plan). We would like to emphasize the importance of maintaining this component in the FEIS, and request that a more detailed, robust monitoring program be outlined in the FEIS. The ERI is also prepared to contribute their expertise to achieve monitoring goals in the next 10 years. In the DEIS's treatment of monitoring and adaptive management, we have identified five key concerns: i. Gaps and Missing Components. Overall, the adaptive management plan and monitoring plan are not complete. Examples of gaps include an incomplete adaptive management plan, missing monitoring components (socio-economic monitoring plan and implementation monitoring plan), and missing cost estimates and financial commitments. ii. Scale. The three monitoring scales in the	(165-93) Please see the response to #165-83. (165-94) We agree that the adaptive management and monitoring plan (AMMP) in the DEIS was not complete. Please refer to the revised Plan in the FEIS. The adaptive management plan developed collaboratively with our stakeholder partners presents a framework through which the Forest Service is able to respond to new information collected through the monitoring process. Analysis of monitoring data by Forest Service staff and by the Multi-Party Monitoring Board will yield information that will be considered in the evaluation of adaptive management options. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a
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	DEIS are stated as: fine-scale, which is the group or site; mid-scale, which is the restoration subunit; and landscape scale, which is the restoration unit and/or project area (page 660, DEIS). This statement is confusing when referencing Table 142, displaying monitoring scales (page 661, DEIS), which does not show any monitoring scales below the sub-unit (1,000 to 10,000 acres). While monitoring is proposed at scales large enough to match the landscape-scale approach of the project, many of the treatments focus on achieving desired conditions and objectives at the group, acre, and stand scales. Data will be collected at four spatial scales, including the site, but does not directly link up with site-level desired conditions in the Silvicultural Specialist Report. iii. Monitoring and Prioritization. Overall, the DEIS presents a lower priority for effectiveness monitoring than is reflected in the Stakeholder Group's monitoring documents. iv. Financing of Monitoring. The DEIS lacks a transparent commitment to monitoring and linkages to prioritized monitoring Tiers. ERI supports the Stakeholder expectations to prioritize monitoring dollars to Tier 1 and Tier 2 monitoring. There is an inconsistent presentation of monitoring costs throughout the DEIS monitoring plan. v. Structure and function of the multi-party monitoring board. While the DEIS includes the concept of a Multi-party Monitoring Board (Monitoring Board), such a group is referred to only as part of the Collaborative Forest Landscape Restoration Program (CFLRP) monitoring requirements, not as a part of the overall project monitoring and adaptive management plan. We understand that through the 4FRI collaborative process, the Forest Service has verbally indicated that some level of partner engagement will occur with project monitoring.	portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols.
Waltz, Amy	8. The following comments are specific to Appendix E: Adaptive Management and Monitoring, and replicate the comments submitted by the 4FRI Stakeholders. a. Discussion of Concern: The ERI agrees with the concerns and recommendations identified by the 4FRI Stakeholder Group. We reiterate those comments here: The ERI appreciates and supports the important role given to monitoring and adaptive management in the DEIS, as outlined in Appendix E (Alternative B Through D Monitoring and Adaptive Management Plan), and the important role given to implementation checklists in	(165-94 or 95) We agree that the adaptive management and monitoring plan (AMMP) in the DEIS was not complete. Please refer to the revised Plan in the FEIS. The adaptive management plan developed collaboratively with our stakeholder partners presents a framework through which the Forest Service is able to respond to new information collected through the monitoring process. Analysis of monitoring data by Forest Service staff and by the Multi-Party Monitoring Board will yield information that will be considered in the evaluation of adaptive management options. Where sections of the Plan continue to lack

the DEIS, as outlined in Tables 112 to 115 in Appendix D (Alternative B Through D Implementation Plan). We would like to emphasize the importance of maintaining this component in the FEIS, and request that a more detailed, robust monitoring program be outlined in the FEIS. The ERI is also prepared to contribute their expertise to achieve monitoring goals in the next 10 years. In the DEIS's treatment of monitoring and adaptive management, we have identified five key concerns: i. Gaps and Missing Components. Overall, the adaptive management plan and monitoring plan are not complete. Examples of gaps include an incomplete adaptive management plan, missing monitoring components (socio-economic monitoring plan and implementation monitoring plan), and missing cost estimates and financial commitments. ii. Scale. The three monitoring scales in the DEIS are stated as: fine-scale, which is the group or site; mid-scale, which is the restoration subunit; and landscape scale, which is the restoration unit and/or project area (page 660, DEIS). This statement is confusing when referencing Table 142, displaying monitoring scales (page 661, DEIS), which does not show any monitoring scales below the sub-unit (1,000 to 10,000 acres). While monitoring is proposed at scales large enough to match the landscape-scale approach of the project, many of the treatments focus on achieving desired conditions and objectives at the group, acre, and stand scales. Data will be collected at four spatial scales, including the site, but does not directly link up with site-level desired conditions in the Silvicultural Specialist Report. iii. Monitoring and Prioritization. Overall, the DEIS presents a lower priority for effectiveness monitoring than is reflected in the Stakeholder Group's monitoring documents. iv. Financing of Monitoring. The DEIS lacks a transparent commitment to monitoring and linkages to prioritized monitoring Tiers. ERI supports the Stakeholder expectations to prioritize monitoring dollars to Tier 1 and Tier 2 monitoring. There is an inconsistent presentation of monitoring costs throughout the DEIS monitoring plan. v. Structure and function of the multi-party monitoring board. While the DEIS includes the concept of a Multi-party Monitoring Board (Monitoring Board), such a group is referred to only as part of the Collaborative Forest Landscape Restoration Program (CFLRP) monitoring requirements, not as a part of the

specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols...

overall project monitoring and adaptive management plan. We understand that through the 4FRI collaborative process, the Forest Service has verbally indicated that some level of partner engagement will occur with project monitoring. b. Recommendations: i. Gaps and Missing Components: The ERI recommends that the Forest Service use the stakeholder-developed monitoring plans (Biophysical and Socio-Economic) in the FEIS, and that the Forest Service complete the Adaptive Management Plan in partnership with the Stakeholder Group's Landscape Assessment and Monitoring (LAM) Committee. Specific recommendations include: 1. Adaptive Management. The ERI recommends that the FEIS include a commitment to incorporate the findings of the monitoring program into future management decisions in a finalized Adaptive Management plan, showing clear links to how adaptive management changes will incorporate the collaborative work of the Stakeholder Group and the Forest Service decision authority. We recommend clearer linkages among the adaptive management triggers and the range of alternatives analyzed in the FEIS. 2. Monitoring. a. Implementation: The ERI recommends that the DEIS monitoring plan be expanded to include in very specific terms the requirements for an Implementation Monitoring Plan that includes quantitative, qualitative, and effectiveness monitoring (including sampling methodology, frequency of measurements, and data sources). b. All Monitoring. The ERI recommends that in collaboration with the stakeholders, the Forest Service complete all cost columns (e.g., those in Table 143 (p. 663) and other similar ones) that will be incorporated from the stakeholder monitoring plans in Implementation/ Compliance, Biophysical, and Socio-Economic Monitoring Plans. ii. Scale. The ERI recommends that the scale of all (Implementation, Biophysical, and Socio-Economic) monitoring be clarified with respect to the scales of the effects analysis and the silviculture implementation plan (e.g., which monitoring indicators are appropriate for the analysis scale, or are we missing appropriately scaled indicators?). We recommend Table 142 be revised (see recent stakeholder monitoring plan and tables included below) to more clearly link the analysis scales and monitoring scales. iii. Monitoring and Prioritization. Change description of monitoring

	tiers in Monitoring Plan to "Note, Tier 1 includes both implementation (compliance) monitoring and effectiveness monitoring. While these are designated as 1a. and 1b. for clarification, priorities between the a. and b. designations remain equal" (page 660); Modify table 142 as below and in attached supplemental document (AM and Monitoring for 4FRI EIS). Table 142 displays the monitoring tiers and their prioritization - see ERI Letter iv. Financing of Monitoring. The ERI recommends: 3. The FEIS includes a financial commitment to monitoring, as suggested in the 4FRI CFLRP proposal: "Financial resources (both USFS and Stakeholder contributions) will be dedicated to monitoring; in particular, 10% of CFLRP allocated dollars will be appropriated to meet monitoring Tier 1a and 1b indicators"; and 4. Completing the monitoring plan "costs" column (p. 666, DEIS) with Stakeholder Group collaboration. v. Structure and function of the multi-party monitoring board. We request that the FEIS provide additional detail on the structure, function, and pertinence of a Monitoring Board to the multiple variables suggested for monitoring. The diversity of the 4FRI Stakeholder Group and of all parties and individuals interested in the outcome of this forest restoration project suggest a high level of public interest. Formalizing the involvement of a board in the monitoring (and an equally important feedback loop in an adaptive management program) is a critical component of implementing this project.	
Waltz, Amy	Comments from 4FRI Stakeholder Group	(155-1) No response required. This comment identifies the commenter.
Waltz, Amy	The Four Forest Restoration Initiative (4FRI) Stakeholder Group would like to thank the Coconino,Kaibab, Apache-Sitgreaves, and Tonto National Forests for the efforts completed over the last several years to jointly plan this landscape-scale project. We should all be proud that we have an analysis covering almost 1 million acres. This is the scale at which natural disasters happen, and it is a scale that will truly make a difference in the management and ecosystem health of these lands. We have been a partner with the Forest Service (USFS) staff and leadership, and have together expended countless hours in meetings, discussions, analysis, and documentation to help as the USFS created this Draft Environmental Impact Statement (DEIS). The Stakeholder Group has put forth this	(155-2) Thank you for dedicating so much valuable time to review the draft EIS and provide comments that will improve the analysis. We look forward to completing the FEIS and ROD and moving on to implementation.

	tremendous effort because the members believe restoration is the right thing to do. The Stakeholders appreciate the USFS for their willingness to collaborate, listen, explain, participate in joint problem-solving, and to use our input in formulating a progressive and aggressive project that will serve as a showcase for the rest of the nation. The Stakeholders also appreciate the opportunity to review and comment on the DEIS.The comments presented here are ones that the we, with diverse participation and full formal review,are now pleased to submit in support of making the Final Environmental Impact Statement (FEIS)document as defensible and usable as possible. Many members and/or member organizations will be submitting separate comments under their own letterhead.The comments included in this letter have been adopted through the use of the 4FRI Stakeholders review and decision tools.The level of agreement reached is bolded following recommendations in each section. Comments represent formal 100% consensus, except where specifically noted.Below, please find several key issues that we would like to comment on, including commendations, some observations, and some issues. The Four Forest Restoration Initiative (4FRI) Stakeholder Group would like to thank the Coconino, Kaibab, Apache-Sitgreaves, and Tonto National Forests for the efforts completed over the last several years to jointly plan this landscape-scale project. We should all be proud that we have an analysis covering almost 1 million acres. This is the scale at which natural disasters happen, and it is a scale that will truly make a difference in the management and ecosystem health of these lands. We have been a partner with the Forest Service (USFS) staff and leadership, and have together expended countless hours in meetings, discussions, analysis, and documentation to help as the USFS created this Draft Environmental Impact Statement (DEIS). The Stakeholder Group has put forth this tremendous effort because the members believe restoration is the right thing to do. The Stakeholders appreciate the USFS for their willingness to collaborate, listen, explain, participate in joint problem-solving, and to use our input in formulating a progressive and aggressive project that will serve as a showcase for the rest of	
Waltz, Amy	the nation.The Stakeholders also appreciate the opportunity to	(155-3) This is a duplicate of comment 155-1.

Waltz, Amy	review and comment on the DEIS. The comments presented here are ones that the we, with diverse participation and full formal review,are now pleased to submit in support of making the Final Environmental Impact Statement (FEIS) document as defensible and usable as possible.Many members and/or member organizations will be submitting separate comments under their own letterhead. The comments included in this letter have been adopted through the use of the 4FRI review and decision tools. The level of agreement reached is bolded following recommendations in each section. Comments represent formal 100% consensus, except where specifically noted. Below, please find several key issues that we would like to comment on, including commendations, some observations, and some issues. Key Issue 1: Degree of Openness Acknowledgements 1.Comparing the 2012 preliminary draft with the DEIS, the DEIS incorporated stakeholders comments, for example: 2 a.An overview of the landscape-level changes in density and/or canopy openness was included in Appendix G, throughout Chapter 1, in Chapter 3 in the silvicultural section, and in more detail in the Silvicultural Specialist Report. b.In particular, Appendix G was intended to summarize landscape effects in terms appropriate for wildlife. c. An intensity of treatments map was developed following canopy cover conversations in mid-2012, which is included in the bridge habitat document, page 703. 2.The DEIS provides specific information about wildlife corridors and specific species needs.	(155-4) Thank you for acknowledging our efforts to have the collaborative effort integrated and visible in the EIS. In response to comments on the DEIS we have updated the discussions on openness to improve clarity.
Waltz, Amy	Discussion of Concern: There are 5 key concerns that the stakeholder group identified: 1.We are concerned about how post-treatment openness will be quantified to determine whether desired conditions are being met and that, without a clear operational plan, heterogeneity in groups and openings may be less than desirable. DEIS discussion: Clarification is needed because different readers have different interpretations or do not understand what the degree of openness will be post-treatment. Table 3 states that the l change from 74% to 59% of the landscape, a reduction of only 15%. Some stakeholders are concerned that it is not enough of a change to reach desired conditions for understory diversity and abundance, system resiliency and heterogeneity. However, the assumptions the DEIS	(155-5) Thank you for your comment and concern. In response to comments and concerns on the DEIS, we have made clarifications in the FEIS that are designed to resolve the issue related to post-treatment landscape openness (and openings). The FEIS in Chapter 3 and Appendix C-G of the silviculture specialist report will have a discussion of how each treatment compares with the natural range of variability for multiple metrics that will display how each proposed treatment compares with the natural range of variability for southwestern ponderosa pine as outlined in RMRS GTR-310.The implementation plan (web-based DEIS Appendix D) included a variety of designs that utilize a “read the land” approach. For example pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would

analysis makes to determine post treatment moderately-closed to closed forest are not stated, so there is a concern that canopy closure may be overestimated, since the analysis appears to be based on forest designations (e.g. MSO PAC = closed), not on actual forest structure metrics. While the USFS addressed concerns about openings in response to comments made in 2012 by adding an explanation in Appendix D (Implementation strategy), Appendix G (Bridge Habitat Document), and sections of Chapter 1 (History of Issues) and Chapter 3 (Alternative Development), some uncertainty remains: 1.How will post-treatment openness compare with natural conditions; is this on a trajectory toward a restored condition? 2.How will openness be implemented with respect to the range and proportion of various opening sizes? 3.How will openings be selected operationally? 4.What sort of monitoring will be conducted related to degree of openness? 2.Not enough information is presented in a way that readers can visualize post-treatment stands to evaluate heterogeneity of groups and openings and connectivity of forest conditions.

vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would vary depending on existing conditions. Along with the design, table 140 (web-based DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (web-based DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the “red zone” density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees

		and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3 and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In addition, (in response to feedback and comments received on treating less aggressively and leaving more large trees), alternative C and E was modified to have canopy cover measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
Waltz, Amy	DEIS discussion: a.While tables provide a great deal of information, visual representations of the data would be helpful. From the data provided some readers see the end condition as having too much of the landscape covered with trees, while others see it as being too open. Many believe that there is a risk of repetitious application of opening sizes that could result in homogeneity at various scales. A visual representation is needed to show effects of guidelines for regeneration openings because tables and guidelines do not capture it (for example, if regeneration openings cannot be adjacent to interspaces, then what are the impacts for tree group sizes?). 3.Depending on the prescription, basal area in groups can be quite high to achieve stand desired condition.This could lead to a dominance of uniform small trees in groups, which may not put those groups on a trajectory toward restoration. DEIS discussion: Table 140, on page 654 of the DEIS, displays the relationship between interspaces, tree groups,regeneration openings and basal area. As the interspace percentages increase, especially in combination with regeneration opening increases, group basal areas are consistently in the red SDI zone (the red zone indicates a higher level of within group tree mortality as a result of competition).There is a concern that managing for groups under forest plan amended goshawk guidelines, as proposed in the DEIS, may result in post-treatment conditions outside of the stakeholder desired conditions as described in the Landscape Strategy and the Biophysical Monitoring Plan.The basal area (BA) metrics in Table 140, for example, show how difficult it is to pack the entire BA into groups in stands that have higher levels of desired openings unless there are large trees initially. Those high now, and it will be difficult to grow large trees in really dense stands. 4.Planned openings on average are smaller than would be optimal for snowpack accumulation and retention, which are important for promoting soil water storage, plant vigor and forest resilience.Few openings of this larger size are planned.	
Waltz, Amy	DEIS discussion: Openings up to 1.5 to 2 times as wide as the height	(155-7) The purpose of the project is restoration and it was not

	(H) of neighboring trees maximize snowpack accumulation (Fig. 1 and 2, Ffolliott et al. 1965). Optimal snow water equivalence in snowpack in ponderosa pine forest of north central Arizona occurs in openings at ½ to ¾ the height of the surrounding trees. This relationship is not dependent on the density of the neighboring trees. PIPO stands of 60-to 80-foot trees would need openings of 30 to 60 feet for highest snow water equivalence at a given point and 90 to 160 feet for total maximum water storage in snowpack. In the Implementation Plan, Table 120 (Interspace percent and width in LOPFA WUI and UEA treatments), only the most open WUI stands would have average interspace width of 120 feet. Interspaces in intermediate thin (IT) and stand improvement (SI) prescriptions are quite low (25-40 feet to 60-80 feet -see interspace width in Appendix D Implementation Plan tables) which might reduce the available moisture for these tree stands due to reduced snowpack retention. See Figures 1 and 2 in the stakeholder letter. Snow water equivalence in snowpack from multiple storm throughout the winter in untreated forest with basal area 135 ft2 at the Beaver Creek Experimental Watersheds (Ffolliott et al.1965)	designed for optimal snowpack accumulation or water yield. This is an expected outcome. The water quality and water yield analysis can be found on page 111 to 115 in the DEIS. In alternative C, the analysis states, "More acres would receive mechanical vegetation treatments than alternative B and more trees would be removed from within Mexican spotted owl (MSO) protected activity areas (PACs) since trees up to 18-inch d.b.h. would be removed. Water yield would, therefore, be expected to be slightly higher than under alternative B since there would be more forest openings and less dense forest conditions. Snow interception by tree canopies would be reduced more under this alternative than under the proposed action, therefore, potentially increasing winter snowpack more than would occur under alternative B". Please see our previous response on post-treatment openness and group size.
Waltz, Amy	5.The fire behavior analysis was conducted as if all treatments happened simultaneously rather than over time. Hence, at any given time fire desired conditions (less than 10% of landscape with crown fire activity) will not actually be met. DEIS discussion: Treatments will occur over time, rather than instantaneously as the fire model assumes. Because of this, along a time continuum, greater than the DEIS proposed 42% of the landscape will remain in moderately closed to closed condition. As a result, the expected fire behavior post-treatment is conservative because of the assumption that all forest treatments would occur in one year. In reality it will take 10-20 years of implementation to accomplish all proposed forest treatments. In addition, utilizing Shultz Fire conditions (around 85 percentile weather conditions) further diminishesmodeled fire behavior. Northern Arizona reaches 97 th percentile weather conditions every summer leading to even higher potential crowning activity and fire intensity.	(155-8) The DEIS analysis (DEIS, chapter 3, fire) indicates desired conditions would be met within 10 years. Until treatments are accomplished, the fire behavior/risk condition would be similar to no action and similar to any other vegetation project that is conducted. The cumulative effects analysis does discuss how ongoing and reasonably foreseeable actions would affect fire risk and behavior. Collaboration between the Forest Supervisors and the stakeholder is likely to drive actual implementation (sequencing). This is entirely removed from the NEPA analysis which considered a 10-year period for treatments. The methodology for modeling and limitations thereof, are displayed in the fire ecology specialist report which is included by reference within the DEIS. Regarding the 97th percentile, Northern Arizona does not reach the '97th percentile weather conditions every summer…" While there are weather indices, such as Energy Release Component (ERC), or Burning Index (BI), which are sometimes modeled by percentiles, and there are specific weather variables that go with these percentiles, ERC and BI are not the same as 97th weather percentiles. We used FireFamily Plus to analyze 12 years of data (2001 –

		2012) from the Flagstaff Automated Weather Station (RAWS). Using data from 1968 through 2012, we determined 97th percentile weather for two periods of time during the fire season. The first period was from April 15th though July 15th, in order to roughly correspond with the most extreme fire season (Partial). The other period was from April 15th though September 15th, to include monsoon and some post-monsoon (Full). There are numerous variables that could be included. We used Maximum Temperatures (MxT); Minimum Relative Humidity (MinRH), Wind Speed (WS), and fuel moisture for 1 and 10 hour dead fuels because these parameters are the most important to fire spread. Of the 1,836 days between April 15th and September 15th, there were no days on which all weather factors reached the 97th percentile for either the Partial or Full periods. Wind is the single most important fire weather factor for wildfire spread in the project area. The 97th percentile wind occurred on 16 days for the full period (0.9% of the days), and 11 days of the partial (0.6% of the days). 97th percentile wind was 22 mph for the full period, and 23 for the partial. 97th percentile winds co-occurred with up to two other variables on 7 days (0.4% of days) for the Full period, and for none of the Partial period. Concern has been expressed that using 20 mph wind is not representative. For the Full period, 20 mph was the 95th percentile, and for the Partial it was ~91 percentile.
Waltz, Amy	1.Degree of post-treatment openness Provide a graphic, such as (planimetric and profile visual representations) to show examples of forest pattern at the stand scale for a set of different treatment types and intensities so that readers have a clearer view of how the end result of different treatment types will look (see fact sheet canopy cover developed by ERI as an example). Use representative sites where stand data are available (rather than interpolated) and focus on treatment types that occur across much of the landscape, such as UEA 40-55. a.Rather than just giving a range of average opening sizes, provide overall range of sizes and the approximate proportion of different sizes for each treatment type so that the expected proportion of various sizes of opening is clear and the reader can get a sense of how much heterogeneity there will be in opening sizes. This might be written in a similar fashion as how the proportion of different tree densities is discussed on page 619 of the DEIS, but with a clear explanation that these proportions are	(155-9) Please see our previous response on openness and group size. In addition, in response to comments the FEIS will include clarifying language in the implementation plan (FEIS Appendix D) in regards to heterogeneity. In regards to training of operators, this is not a NEPA decision and will be accomplished during implementation. The Forest Service will continue to work with stakeholders to provide training opportunities for operators.

guidelines, not prescriptive. b.Similarly, provide the proportion of different tree group sizes for each treatment type so that it is clear how much heterogeneity there will be in tree group sizes. c.Strengthen discussion of how openness will be measured and tie these metrics to the adaptive management plan. d.In the Implementation Plan (Appendix D), Chapter 2, Section B add some narrative ahead of Table 139 that describes how operators will be traine conditions. Specifically, describe how operators will select opening sizes and inspectors will track that the ranges of opening sizes are consistent with historic forest pattern. e.Through methods and thresholds described in the adaptive management plan, explain how the USFS will monitor degree of openness and adaptively respond if openness objectives are not met. 3. Group size and densities a. Expand metrics of post-treatment desired conditions to give better context of basal area. Provide literature-supported trees per acre (TPA) as example depictions of post treatment condition. b. Clarify what red zone management goals are on Fig 74 (page 657, what does this footnote mean?) and how that translates to Table 140. Does this mean that red squares are not a viable management option? Does it mean that existing small, densely treed groups will not be treated but left on the landscape? Or that these groups will not be maintained, but treated in another way? c. Provide a link to the indicators in the Stakeholder-developed Biophysical Monitoring Plan and the proposed adaptive management plan so that it is clear how group density will be addressed over time.

4. Opening size and watershed restoration a. Provide more justification for existing openings size guidelines (additional reference support available). b. Provide a broader range of opening sizes and shapes capable of retaining a greater volume of snow water. c. Provide the range and proportion of opening sizes for each treatment type so that it is clear how much heterogeneity there will be in opening sizes. d. Assuming these are met in the FEIS, please make additions to Table 114 in implementation checklist or Table

Waltz, Amy 139:

i. Develop guidelines for operators to follow when implementing ?designation by prescription? or ?designation by description? to

Waltz, Amy ensure a diversity of opening and group sizes consistent with historic

(155-10) Please see our previous response on water yield.

(155-11) The silvicultural prescriptions (which are designed in alignment with the implementation plan--Appendix D of the DEIS and FEIS) will provide sufficient direction on how openings should be designed.

	conditions and that benefit snowpack retention. Describe guideline development in the EIS. ii. Include in operator guidelines directions for selecting tree groups that will provide adequate shading of openings to promote the retention of snowpack.	
Waltz, Amy	5.Fire behavior and temporal effects a.Include a framework for sequencing treatments in the FEIS. b.Provide better description of how on-going fire (both prescribed ignitions and natural-ignitions)will be utilized to achieve desired conditions. If not captured in this EIS, where is the management direction new forest plan? c.The USFS should acknowledge in the FEIS that the fire behavior metrics used to model extreme fire behavior were based on all treatments being completed at once. State the implications of this assumption more clearly and how they influence desired conditions.	(155-12) Please see our previous responses on the fire behavior metrics. This analysis focuses on the application of prescribed fire to achieve restoration desired conditions. It would speculative to consider how natural ignitions would or could affect the landscape (move towards desired conditions). The fire analysis (DEIS, page 158) states, "As thinning and first entry burns were completed, burn windows would expand for larger areas so more burning could occur when ventilation was good. The ability to manage unplanned unplanned ignitions would expand as 4FRI (and other projects) is implemented". We will expand the description of assumptions in the specialists' report to better explain. Fire modeling can be compared with the contrast in a picture. If it's turned up too far (extreme fire conditions) or turned down too far (moderate to low conditions), details are lost. By modeling moderately high conditions, we were better able to identify areas of the greatest concern.
Waltz, Amy	Final outcome: Unanimous agreement on recommendations 1-4; recommendation 5 is All Agree by Eastern Arizona Counties Organization (ECO):Reservation documentation (Pascal Berlioux): The Eastern Arizona Counties Organization (ECO) agreed with written integrate in the NEPA Record of Decision a schedule of execution, a commitment to it, and, therefore,an accountability mechanism for it. The Eastern Arizona Counties Organization fully understands that such sequencing and timing, and the resulting implementation schedule, could be modified as a result of unforeseeable events such as natural ignition fires. This is precisely why the concept of adaptive management is nested within the 4FRI DEIS. The Eastern Arizona Counties Organization strongly disagrees with the argument made during the 4FRI stakeholders meeting that adaptive management precludes an execution plan including timing and sequencing of the treatments. The very concept of adaptive management implies an initial plan, which may be adapted as required, as events unfold.Because the timely implementation of the restoration treatments is critical to meeting the purpose and needs of the	(155-13) Thank you for your comments. The disclosure of sequencing within a NEPA document would be problematic because it would bind the Agency to a fixed schedule that may be unattainable due to weather, fires, markets, or other unforeseen circumstances. It would likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS does not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation (concern) is most appropriately addressed in implementation and operations.

proposed action, the Eastern Arizona Counties Organization is concerned that the spatial and temporal sequencing of the treatments has a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Consequently, the absence in the 4FRI DEIS of spatial and temporal strategic timing and sequencing of the treatments, and the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI FEIS.

Discussion of Concern: Stakeholders considered whether the Land Resource Management Plan (LMRP) should to be amended to accomplish the purpose and need of the project. Appendix B (page 439) in the DEIS covers the Forest Plan amendments. The amendments are also covered in Chapter 2 – Alternatives, and Chapter 3 – Affected Environment and Environmental Consequences. The plan amendments are also linked to plan amendment direction set forth in USFS Manual (FSM) 1926.52 and USFS Handbook (FSH) 1909.12 – 25.4. Based on reviewing this key concern, the Stakeholder Group also identified two additional sub-concerns, both tied to the question: Are these plan amendments significant as outlined in FSM 1926/52? We looked at the different parts of the proposed amendments, and considered circumstances that constitute significance, specifically, changes that would significantly alter the long term relationship between levels of multiple-use goods and services originally projected, and changes that may have an effect on the entire land management plan or affect land and resources throughout a large portion of the planning area. The first sub-concern is that the habitat acreages and percentages stated in the DEIS to support a determination of non-significant, for Amendment 2 on the Coconino and Amendment 1 on the Kaibab, are not clearly displayed. As a result, the public cannot easily identify the number of acres to be affected, compare potential treatment acres across forests, or concur with a non-significant determination. How the USFS determined that the canopy cover portion of the amendment would affect only 18% of goshawk habitat on the

Waltz, Amy

(155-14) We have clarified where the acres or habitat-specific numbers are derived. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52(DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest

Coconino and 20% on the Kaibab is unclear. There are 399,633 acres of goshawk habitat within the 4FRI project area. The amendments apply to both PFA and LOPFA acres. The most intensive treatments would be in LOPFA which covers 369,033 acres in the project area. The analysis covering the Coconino states that only 139,308 acres would be affected (page 465, DEIS). The Kaibab amendment analysis does not give acreage numbers for the portion of the Kaibab potentially affected, just states that 27% of goshawk habitat within the project area would be affected (page 481, DEIS). When displaying the number of acres and percentages of habitat in the project area to be potentially affected, the USFS should include a clear discussion of any further stratification of data used to support a non-significant determination. Given the gap between potential treatment acres and acres, it is likely that the USFS applied the analysis to only VSS 4, 5 and 6. If this is the case, the DEIS should also analyze the cumulative effects of stratifying the data in this manner.

plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51).With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b) (3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised

Waltz, Amy	The second part of the Stakeholder Group?s sub-concern (significance of the amendments), is tied to MSO monitoring and the information related to just how that monitoring will occur. The USFS needs to clarify the process for a determination of non-significant	MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C): Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests (RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters on the DEIS stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. Please note, in the FEIS, all amendments have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS). 155-15) Alternative C was designed to be in alignment with the 2012 Mexican spotted owl Recovery Plan. The metrics included in the forest plan amendment (and alternative) were analyzed fully (see DEIS, chapter 3, wildlife). It is not accurate to state the analysis was deferred

	when language for standards and guidelines is not included in the DEIS, but referred to as a part of a separate planning process. The DEIS does not contain the appropriate level of information for the reader to see all proposed activities, including monitoring. For the MSO Amendments, population and habitat monitoring for all action alternatives is deferred to the Fish and Wildlife Service's (FWS) biological opinion for the project/ Treatment design under habitat treatment in incremental percentages is also deferred to the FWS biological opinion. While proposed forest plan language contains specific basal area ranges and tree diameters, the analysis cannot be completed when specific direction is deferred to another document not covered in the DEIS. Tables related to proposed plan language changes direct the reader to See Standards for Monitoring Directions/ This statement appears under the proposed new standards or guidelines language column. Does the Forest plan to add the language to which the reader is referred? If not, where specifically in the DEIS can the standard and guideline language for MSO be found? Recommendations: 1. For the key part of this issue, the Stakeholder Group would not recommend a change to the DEIS as it relates to plan amendment language under alternatives B, C, and D. We recognize that the plan amendments were necessary to implement the many aspects of these alternatives. However we recommend that the USFS address Key Issue 2b below in relation to analysis of the need for plan amendment. Final outcome: Unanimous agreement	to another, separate process. As noted previously, the purpose of amendment 1 is to bring the alternative in alignment with the revised MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan that is included in the FEIS (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E in the FEIS. In addition to MSO (and goshawk) monitoring, appendix E in the FEIS now incorporates monitoring for Arizona bugbane.
Waltz, Amy	2b: Adequate Analysis of Treatment Alternatives Compared to the Proposed Action Discussion of Concern: Chapter 2 of the DEIS indicates that five issues were identified from the public comments received in scoping, suggesting alternative methods be considered in achieving the purpose and need. The narrative indicates that these five issues were evaluated, with two of the issues being analyzed as detailed Alternatives (Alternatives C & D). However, many stakeholders are concerned that there does not appear to be an adequately-detailed analysis or the range of alternatives needed to effectively evaluate the tradeoffs between these issues and the accomplishment of project objectives stated in the DEIS.	(155-16) Thank you for your comments and concerns. The Agency is required to: “Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act”(40 CFR 1501.2(c)). “The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed “(36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic

Waltz, Amy	Sub-restore forest structure and pattern, forest health, and vegetation composition and diversity.page 9, DEIS). Without a detailed analysis to document the variance from the Historic Range of Variability (HRV) there is concern that restoration objectives will not be achieved, and progress toward meeting Desired Conditions cannot be adequately measured.	standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14).The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS, as well as a full restoration alternative that was considered but eliminated from detailed study. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study. (155-17) In response to comments from Northern Arizona University's Ecological Restoration Institute, and others, tables, discussions, and an appendix of comparisons were added for the Natural Range of Variability to which proposed treatments are compared. To set the goals that underlie these treatments, it is useful to know as much as possible about past forest conditions, especially the reference conditions that existed before forest structure and function were altered by Euro-American settlers. Such conditions were not static, but they sustained themselves across what has been called their Natural Range of Variability (NRV) (Friederici, 2004). Post-treatment effects are discussed in context to how treatments move the alternatives towards, or away from, their NVR and their planning desired conditions. An additional appendix was developed (Appendices C-G) that show the

		comparisons among ponderosa pine basal area, All Basal Area, ponderosa trees per acre, and all trees per acre >5" d.b.h. against their respective NRV, for each planned treatment by alternative (some 612 table/graph combinations).
Waltz, Amy	Sub-concern 2: With respect to the need to amend the forest plans, there is an action alternative where a plan amendment would not take place. Without such an alternative it is difficult to understand the environmental effects and tradeoffs for resources that would result from the amendments themselves.	(155-18) In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments (alternative E) was analyzed in the FEIS. No forest plan amendments are proposed on the Kaibab NF as a result of having a revised Kaibab NF forest plan.
Waltz, Amy	Sub-concern 3: For many resources there are not significant differences between the action alternatives, which results in a limited scope of analysis and only minor differences in outcomes (including the key outcome of meeting the project objectives). The Stakeholder Group is concerned that this limited array of analyzed actions and outcomes may facilitate or expose the DEIS to a significant procedural risk that might lead to a vulnerability issue for the document. Recommendations: 1. The Stakeholder Group did not develop a consensus ?new? alternative to add to the analysis/ However, we recommend that the USFS re-evaluate the document to confirm, as required under NEPA CEQ regulations (CFR 1502.14, & 1503.4(2)), that there is an adequate analysis and range of alternatives that addresses the Purpose and Need and desired outcomes of the project. The Stakeholder Group also recommends that the USFS provide more analysis and information in the DEIS document to display the tradeoffs between possible treatment options for the identified key issues. Final Outcome: All agree, with one "agree by acquiescence" by CNRCD with no specific comment issues. Final Outcome: All agree, with one specific comment	(155-20) Please see comment 155-16 that discusses range of alternatives
Waltz, Amy	Key Issue 3: Translation of the Old Growth Protection and the Large Tree Retention Strategy (OGP & LTRS) into the 4FRI DEIS Discussion of Concern: The USFS (FS) use of the 4FRI Stakeholder Group ?Old Growth Protection and Large Tree Retention Strategy? (OGP & LTRS) to identify key issues, create alternatives, and develop design features and implementation plans for the DEIS is very important to the stakeholder group. Because of this the DEIS was carefully reviewed by the Stakeholders to assess how well the DEIS incorporated the OGP & LTRS. The two discussions and findings are	(155-20) Thank you for your comments.

	recorded below.	
Waltz, Amy	Issue 1: The following analysis (in italics) pertains to the how the DEIS incorporates protection of old trees. It does not itemize a particular concern or recommendation, but was important for Stakeholder learning and the basis for the following recommendations. The Stakeholders felt it helpful to include in this comment letter. Discussion of degree to which the OGP was incorporated in the document: There are several places where the direction to protect and manage for old trees is captured in the DEIS. The main direction is found in the Old Tree Implementation Plan – Section C of the Implementation Plan (Appendix D), and within the Implementation Plan itself. There is also direction in the Alternatives section (page 63), where it states- all actions alternatives incorporate key components of the old tree protection strategy into the alternatives features additional references include.	(155-21) General information, no additional response needed.
Waltz, Amy	Appendix D-Table 112. Annual implementation Checklist, Under NEPA, NFMA, ESA, CFLR Act compliance evaluation (page 601) There is a check-off line that asks if the treatments are consistent with the Old Tree implementation Plan (section C). Appendix D -Section C – Old Tree Implementation Plan (page 644) Old Tree Descriptions and Illustrations: ?Old trees (approximately >150 years old; [presettlement trees]) would be retained, with few exceptions, regardless of their diameter, within the 4FRI on the Coconino and Kaibab NFs EIS area. Removal of old trees would be rare. Exceptions would be made for threats to human health and safety, and those rare circumstances where the removal of an old tree is necessary in order to prevent additional habitat degradation. Old trees would not be cut for forest health issues or to balance age or size class distributions. One example of a situation where the removal of an old tree is necessary in order to prevent additional habitat degradation is in the rare case of an old tree growing on the side of an existing curve in a road. Logging equipment may require a wider turning radius. The options are to relocate the road or cut the old tree and widen the curve to accommodate the larger turning radius. Relocating the road would result in a larger area of the forest being permanently disturbed, versus cutting the large tree and widening the curves radius. This is an example where cutting the old tree	(155-22) General information. No response required.

	would result in less habitat degradation then relocating a road.(page 644)	
Waltz, Amy	From Implementation Plan: ?Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention. Manage for the sustainability of individual/isolated old ponderosa pine trees as defined in the old tree implementation strategy by reducing crown competition and increasing growing space adjacent to these trees. Remove ponderosa pine trees up to 18 inches d.b.h. that do not meet the old tree definition: (1) within a 50-foot radius that are in the intermediate or suppressed crown positions and (2) that would eliminate direct crown competition on two of the four sides of the old tree/? (page 618-619 and elsewhere [all treatment descriptions] within the Implementation Plan).	(155-23) General information. No response required.
Waltz, Amy	Section B – Decision Matrix (page 642): For each feature it has a reference to the old tree characteristics (page 642), which identifies leaving old trees regardless of tree size. In summary, the direction in Section C basically says old trees will not be cut except for threats to human health and safety, and those rare circumstances where the removal of an old tree is necessary in order to prevent additional habitat degradation. (page 644). It also sets direction to manage for old trees. The project implementation checklist assures that this direction is implemented. The Implementation Plan sets direction for treatment design to incorporate direction in the old tree implementation strategy and thereby manage for old trees to have and sustain as much old forest structure as possible.	(155-24) General information. No response required.
Waltz, Amy	What is unknown is to what degree there will be safety and human health or habitat degradation issue situations as part of project implementation (new road construction, landings and skid trails), and to what extent project activities might affect old tree mortality (prescribed burning mostly, and some harvest activity). The charts on pages 132 and 133 and the write up on page 138 and page 140 indicate that with all action alternatives there will be increases in the amount of old trees and there will be reduced threats from wildfire	(155-25) General information. No response required.

	as part of project implementation and completion. Key Sub Concerns: There were four key issues identified by the working group that we feel need clarification. These include: 1. Old Growth Allocation; 2. Regeneration Openings and Scale; 3. Road Construction and Reconstruction; and 4. Old-Growth Protection during Managed Fire. Each key issue is stated below with questions and recommendations. Sub-Concern #1-Old growth allocation We understand that old growth allocation and old tree protection are two separate issues. Old growth allocation was not discussed in the stakeholder OGP & LTRS. However, old growth allocation has been raised as an important issue because it will contribute to achieving the stakeholder goal of more old growth across the landscape. The DEIS needs more clarity about how old growth allocation is calculated. For example, the DEIS says, Currently, all restoration units meet or exceed the 20 percent minimum forest plan requirement [for old growth allocation] (page 15, DEIS). This statement is contradicted in the very next paragraph which states that, ?Most sites currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans. This apparent contradiction may be semantic but it needs clarification. In addition, in order to understand the impact of the alternatives on old growth allocation the reader is required to calculate data across 12 to 14 tables in the silviculture report. Recommendations: 1Display the old growth allocation by alternative in a single table illustrating the percentages of area in MSO and goshawk habitats as referenced on page 45 of the Silviculture Report. Include how many acres of old growth allocation are in structural stages VSS 5 and 6, and how much of the old growth allocation is close to becoming old growth as defined by the forest plan. 2The USFS should provide more detail and link the write-ups on old growth on page 138, Chapter 3, DEIS and combine it with the write up on ?Large Tree/ Old Forest 0? structure on page 140 in order to describe the impacts of each alternative on old growth allocation. This discussion should reference the new requested table (see above recommendation) in the silviculture report.	(155-26) The DEIS (page 15) stated, "There are approximately 512,178 acres of ponderosa pine in the project area. Of this total, 194,804 acres (38 percent) are the closest to meeting old growth conditions. Currently, all restoration units meet or exceed the 20 percent minimum forest plan requirement". Old growth allocations are based on current conditions within the project area along with forest plan specific management direction. Most sites currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans. However, the habitat types noted below are closest to meeting old growth conditions. This approach is consistent with forest plan direction, which states: "strive to create or sustain as much old growth compositional, structural, and functional flow as possible over time at multiple-area scales…and seek to develop or retain old-growth function on at least 20 percent of the naturally forested area by forest type in any landscape" (USDA 1987, USDA 1988). The old growth section of the FEIS (chapter 1) has been updated to reflect implementing the revised Kaibab NF forest plan and revised numbers. To improve clarity the discussion has been updated in the FEIS, "There are approximately 507,839 acres of ponderosa pine in the 4FRI project area. Of this total, 160,816 acres (36 percent) are closest to meeting old growth conditions. Currently, all restoration units meet or exceed the 20 percent minimum Coconino NF forest plan requirement. Currently, the Kaibab NF has old growth occurring throughout the landscape (consistent with forest plan desired conditions). Approximately 31 percent (83,186) acres of the Kaibab NF in the 4FRI treatment area has the desired older size classes and old growth components are well represented".
Waltz, Amy		
Waltz, Amy	Sub-Concern #2 – Regeneration openings and scale Confusion exists regarding how regeneration openings will be implemented. This could impact the protection of old trees. It is also unclear in the document at what scale the USFS will be balancing the distribution of structural	

	stages, as they relate to regeneration openings, interspaces and tree groups. We know from the DEIS that percentages have been assigned at the small spatial scale. What is unclear is how these will be distributed across the mid-scale (100 to 1,000 acres). Recommendations: 1 In the DEIS in Section C-page 644 add a statement to the Old Tree Descriptions that clearly states old trees will not be cut to create regeneration openings. 2 The USFS should include graphic examples of how regeneration openings will be applied at the fine scale (<100 acres), mid-scale (100-1,000 acres) and restoration unit scale. Use representative sites where stand data is available (rather than interpolated) and focus on treatment types that occur across much of the landscape, such as UEA 40-55.	
Waltz, Amy	Sub-Concern #3 -Road construction and reconstruction Road building is one of the examples (cited on page 644) as a situation where an old tree may need to be removed, rather than relocating a road. When this example was first discussed the USFS thought that very few miles of road would need to be built for this project, citing the high density of existing roads. All action alternatives will have: • 517 miles of temporary road construction and decommission. • Up to 30 miles of road reconstruction and improvement. • Up to 10 miles of road relocation. As it turns out, the miles of temporary road construction have increased from 183 miles in the proposed action (August 2011), to 517 in the DEIS. It is difficult to tell from information provided in the DEIS, what level of impact the near tripling of road miles might have on the preservation of old trees. The DEIS does not provide enough information to evaluate possible impacts from road construction to old trees, or a direction on minimizing potential impacts from road construction. Recommendations: 1 We recommend the inclusion of additional information in the effects analysis describing any anticipated effects to old trees from increased road construction and reconstruction in the 4FRI project area. 2 In addition to the old tree protection direction for mechanical treatments, the USFS should ensure new road design and construction work (for all road work including re-construction, new construction and temporary roads) will incorporate the need to protect old trees. This protection objective will be implemented through avoidance and other design attributes.	(155-28) Chapter 3 of the DEIS disclosed the affected environment for each resource (including roads) and the direct/indirect environmental consequences associated with the action alternatives in chapter 3, from page 105 to page 332. Effects analysis of roads (transportation) can be found in the DEIS on pages 318-321. Table 31, chapter 2, page 96 of the DEIS provides a comparison of the predicted effects of proposed treatments by alternative. The best (and relevant) available science, information, first-hand knowledge of the resources within the project area and experience with past and similar projects informed the effects analysis. In the FEIS, (appendix C) design feature T 11 states, "Temporary road locations should be located in existing openings out of filter strips and avoid removal of trees where feasible. If trees need to be removed, avoid old and large trees and oaks and aspen trees where feasible".
Waltz, Amy	Sub-Concern #4-Prescribed Fire Fire is a significant restoration tool throughout the analysis area. We did not find guidance concerning protection of old trees during prescribed burning. Recommendation: 1. Add guidance that will enhance protection of old trees during prescribed burning. Prescribed fire implementation tactics will also incorporate features that will preserve and minimize impacts to old	(155-29) The design feature for protecting old trees from prescribed fire is found in Appendix C on page 570. Design Criteria #FE12 states, “When practicable, damage or mortality to old trees and large trees would be mitigated by implementing prescription parameters, ignition techniques, raking, wetting, thinning, compressing slash, or otherwise mitigating fire impacts to the degree necessary to meet burn objectives

	trees (such as factoring in soil moisture, ignition techniques, and clearing around old trees, in the burn plans to increase their survival rates, see ERI Working papers #3, 16 & 18).	and minimize fire line intensity and heat per unit area in the vicinity of old trees. Trees identified as being of particular concern(e.g., trees with known nests or roots for herons, eagles, osprey, or other raptors, occupied nest cores, or critical areas in PACs) would be managed in accordance with wildlife design features (see wildlife). Prepare old trees 1 year or more before a burn if possible. “The rationale provided states, “Old trees and large trees are rare components and are underrepresented across the analysis area. Implementing mitigation measures when possible is a critical component of restoration on a landscape scale. Large trees that are not old are not as susceptible to damage from fire. Mitigation measures that can be implemented a year or more before a burn, such as thinning or raking, may improve the health of the tree, improving its response to fire (DEIS, page 570).
Waltz, Amy	Additional Strengthening Recommendations: Each action alternative contains a list of proposed restoration activities. Included in each action alternative is a positive statement regarding the allocation of old growth. A similar positive statement regarding the USFS intent to save as many old trees as possible should be included as a restoration activity. Recommendation: 1. Each action alternative (B, C, and D) should include the following statement: It is the intent of the 4FRI project to protect as many old trees (approximately >150 years old) as possible within the project area. Removal of old trees would be rare, and only would be done in order to prevent additional habitat degradation, as described in Section C, Appendix D, of the 4FRI DEIS. Final outcome: Unanimous agreement on all above recommendations.	(155-30) Please see our previous responses on conserving old trees.
Waltz, Amy	Issue 2: This analysis pertains to the how the DEIS incorporates the large tree retention strategy. The original Old Growth Protection and Large Tree Retention Strategy (OGP & LTRS) was developed by the collaborative and submitted to the USFS in 2011. ?The intention of the exception process is to increase landscape heterogeneity and conserve biodiversity? (OGP & LTRS). The document identified situations where removing post-settlement trees larger than 16 inches diameter at breast height (DBH) would be ecologically and scientifically indicated and therefore socially acceptable. The OGP & LTRS was modified by the USFS into a Large Tree Implementation Plan (LTIP) [section D of the implementation plan (page 646-657)],	(155-31) General information. No further response required.

	and incorporated into part of Alternative C (alternative described on page 80 – statement of incorporation page 37). The key difference between the two large tree retention strategies are shown on page 60 of the DEIS. The primary differences are: • The USFS removed any requirements for a collaborative process prior to large tree removal. This was done because by law the USFS cannot relinquish its decision making authority. • The USFS removed the requirement that trees greater than 16 inches could not be removed to create regeneration openings. This was done to mitigate a violation of the forest plans and to allow the USFS to put openings were they conform to the implementation of the desired conditions (DC). • The USFS incorporated an exception category for situations where there was a preponderance of large young trees that was modified from the OGP & LTRS. The Stakeholder Group recognized that the USFS did not adopt the stakeholder-produced OGP & LTRS verbatim. Some stakeholders felt strongly that the USFS did not meet the intent of the OGP & LTRS in all areas, while others felt that the ?Old Tree? and ?Modified Large Tree? implementation plans included in the DEIS reflected the substance and intent of the stakeholder document and were otherwise sufficient. Consequently, the stakeholder group does not have a 100% consensus statement regarding incorporation of the OGP and LTRS into the DEIS. Because of these differing viewpoints, recommendations on LTRS issues may be provided by individuals and organizations in separate comments.	
Waltz, Amy	Final outcome: Unanimous agreement on above statement.	(155-32) Thank you for highlighting this unresolved issue.
Waltz, Amy	Key Issue 4: Site Specificity of the Analysis Discussion of Concern: The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-	(155-33) Thank you for your comment. However, we were not asked for our consolidated project record during the DEIS comment period. An index of the project record will be available with the FEIS.

Waltz, Amy	specificity is not an issue. However, in the process of looking at the data, the Stakeholder Group?s review team and the USFS realized that the information is spread across a wide variety of reports, files, and locations. At the time, not all of the essential information was available to the public or even part of the official project record. Recommendations: 1 We recommend that the official project record be updated using our interaction with the USFS as a guide for what information the specialists have that needs to be included in the official project record. Specifically, the USFS should include all the needed information in the project record, organize the information better, and prepare a detailed index of the information. The index should show anyone looking for specific information how to find the desired information. The index needs to link to a map so that a person looking for site specific impacts to a particular location can know where to find the related information.	(155-34) Thank you for your recommendation. Please see our previous response.
Waltz, Amy	2 We recommend that this information be attached to the USFS?s interactive map that is currently available on the web. Ideally, this map would allow a mouse-over to link the selected location to the existing condition, desired condition, proposed treatment by alternative, the effects analysis information, and if possible, a graphic representation of the area. If these types of map updates are not possible, at least the map could link to the index referencing what information is available and where in the FEIS or in the project record it is located. Final outcome: Unanimous agreement	(155-35) Thank you for your recommendation. It is not possible to link the project record to the interactive map. A project record index will be available with the FEIS and draft ROD.
Waltz, Amy	Discussion of Concern: With an analysis of 988,674 acres and proposed treatment on up to 593,211 acres, along with 50 other ongoing and foreseeable projects and several wildfires and other natural disturbances in the area, the Stakeholder Group wanted to know whether the DEIS thoroughly analyzes and documents cumulative effects. Appendix F (Cumulative Effects) of the DEIS gives some short summaries of the cumulative effects and then states that the specialist reports are incorporated by reference. It then gives an extensive list of past vegetation management and prescribed fire projects for the area. It lists the cumulative acres of wildfire by year, discusses insect and disease natural disturbances, lists projects on State and private lands, and identifies projects proposed in the reasonably foreseeable future. However, Appendix F contains little	(155-36) Thank you for your observations. Responses are provided below.

Waltz, Amy	text actually describing the cumulative effects on various resources. It appears that most of the cumulative effects documentation is included in Chapter 3, Affected Environment and Environmental Consequences, and in the specialist reports. Throughout the DEIS document, the format used to present cumulative effects varies widely. Some of the cumulative effects descriptions are easy to follow and understand and are reasonably supported, while other statements are made without supporting documentation and some are expressed as opinion. As an example, the soils and wildlife cumulative effects seem fairly well presented, and the rationale for conclusions is given. On the other hand, the silviculture specialist report (page 149, DEIS) includes only three small paragraphs to analyze the cumulative effects of over 500,000 acres of treatment. One of these complete paragraphs states: Alternative _ restoration treatments would contribute an additional 509,195 acres toward improving forest health and vegetation diversity/composition, sustaining old forest structure over time, and moving forest structure toward the desired conditions/? This statement on the cumulative impacts on silviculture appears to be mostly a professional opinion, and what this statement is based upon or measured against is unclear. While the document does include a long list of projects associated with the 4FRI analysis area, what the impact of these projects actually is, and how they affect silvicultural resources in the 4FRI project area, is also left unclear. Overall and generally speaking, the Stakeholder Group thinks a good attempt has been made to analyze and document cumulative impacts. However, because the information is presented in many different formats and document locations, is not cross-referenced or indexed, and varies significantly in depth from resource-to-resource, it is difficult to conclude whether an adequate job of disclosure of cumulative effects has occurred. Recommendations: 1. In the FEIS, cumulative effects analyses for all resources should be presented in a consistent format, such as the format used in the Wildlife and Weed sections. We recommend that the USFS carefully cross-reference Appendix F to Chapter 3 resource sections and specialist reports where they refer to cumulative effects.	(155-37) Thank you for your comment. Affected areas considered for cumulative effects can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. "For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat

		may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political"(FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose.
Waltz, Amy	2. The USFS should provide a detailed index to show where in the chapters, the appendix, and the specialist reports cumulative effects information is presented by resource and treatment type.	(155-38) Thank you for your recommendation. Appendix F has a detailed index in the "Contents" section. Since all our documents are available electronically and are in a pdf format, hyperlinks provide access to each section (from the Contents). However, it does look like we missed an opportunity to add "cumulative effects" to the index where all page numbers would be referenced.
Waltz, Amy	3. The USFS should carefully represent the measures and methods used to draw the conclusions wherever professional opinions are presented.	(155-39) Thank you for your recommendation.
Waltz, Amy	4. The USFS should include the Flagstaff Watershed Protection Project into the cumulative effects analyses as a reasonably foreseeable project. Final outcome: Unanimous agreement	(155-40) In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF).
Waltz, Amy	Discussion of Concern: The Stakeholder Group appreciates and supports the important role given to monitoring and adaptive management in the DEIS, as outlined in Appendix E (Alternative B Through D Monitoring and Adaptive Management Plan), and the important role given to implementation checklists in the DEIS, as outlined in Tables 112 to 115 in Appendix D (Alternative B Through D Implementation Plan). We would like to emphasize the importance of maintaining this component in the FEIS, and request that a more detailed, robust monitoring program be outlined in the FEIS. In the DEIS?s treatment of monitoring and adaptive management, we have identified five key concerns	(15-41) Introductory information. Responses will follow.
Waltz, Amy	1 Gaps and Missing Components: Overall, the adaptive management plan and monitoring are not complete. Examples of gaps include an incomplete adaptive management plan, missing	(155-42) Since the DEIS was published, the Forest Service worked with 4FRI stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party

	monitoring components (socio-economic monitoring plan and implementation monitoring plan), and missing cost estimates and financial commitments.	monitoring board was created to manage and guide monitoring through project implementation.
Waltz, Amy	2 Scale: The three monitoring scales in the DEIS are stated as: fine, which is the group or site; mid-scale, which is the restoration subunit; and landscape scale, which is the restoration unit and/or project area (page 660, DEIS). This statement is confusing when referencing Table 142, displaying monitoring scales (page 661, DEIS), which does not show any monitoring scales below the sub-unit (1,000 to 10,000 acres). While monitoring is proposed at scales large enough to match the landscape-scale approach of the project, many of the treatments focus on achieving desired conditions and objectives at the group, acre, and stand scales. Data will be collected at four spatial scales, including the site, but does not directly link up with site-level desired conditions in the Silvicultural Specialist Report.	(155-43) Please see our previous response. The issue of scales was addressed as the monitoring plan was finalized.
Waltz, Amy	3 Monitoring and Prioritization: Overall, the DEIS presents a lower priority for effectiveness monitoring than is reflected in the Stakeholder Group?s monitoring documents.	(155-44) Please see our previous response and the FEIS appendix E.
Waltz, Amy	4 Financing of Monitoring: The DEIS lacks a transparent commitment to monitoring and linkages to prioritized monitoring Tiers. Stakeholder expectations are to prioritize monitoring dollars to Tier 1 and Tier 2 monitoring. There is an inconsistent presentation of monitoring costs throughout DEIS monitoring plan.	(155-45) Please see our previous responses concerning monitoring.
Waltz, Amy	5 Structure and function of the multi-party monitoring board: While the DEIS includes the concept of a Multi-Party Monitoring Board (Monitoring Board), such a group is referred to only as part of the Collaborative Forest Restoration Program (CFLRP) monitoring requirements, not as a part of the overall project monitoring and adaptive management plan. We understand that through our collaborative process the USFS has verbally indicated that some level of partner engagement will occur with project monitoring.	(155-46) Please see our previous response concerning monitoring.
Waltz, Amy	Recommendations: 1. Gaps and Missing Components: The stakeholder group recommends that the USFS use the stakeholder-developed monitoring plans (Biophysical and Socio-Economic) in the FEIS, and that the USFS complete the Adaptive Management Plan in partnership with the Stakeholder Group?s Landscape Assessment and Monitoring (LAM) Committee. Specific recommendations	(155-47) In summary, a great deal of progress was made on the monitoring and adaptive management between DEIS and FEIS. Thank you for working continuously with us on this plan.

include: a. Adaptive Management: The 4FRI Stakeholder Group recommends that the FEIS include a commitment to incorporating the findings of the monitoring program into future management decisions in a finalized Adaptive Management plan, showing clear links to how adaptive management changes will incorporate the collaborative work of the SH group and the USFS decision authority. We recommend clearer linkages among the adaptive management triggers and the range of alternatives analyzed in the FEIS. b. Monitoring: i. Implementation: The 4FRI Stakeholder Group recommends that the DEIS monitoring plan be expanded to include in very specific terms the requirements for an Implementation Monitoring Plan that includes quantitative, qualitative, and effectiveness monitoring (including sampling methodology, frequency of measurements, and data sources). ii. Implementation: The purpose of the quantitative implementation compliance monitoring is to answer the question ?Was the job done?? The purpose of the qualitative implementation compliance monitoring is to answer the question ?Was the job done correctly?? The Stakeholder Group recommends that both questions be addressed in the implementation and compliance monitoring. Verifying that implementation complies not only quantitatively but qualitatively with the management decision is important, as effectiveness can only be meaningfully analyzed if the actual treatment outcomes are aligned with the intended outcomes. iii. All Monitoring: In collaboration with the stakeholders, complete all cost columns (e.g., those in Table 143 (page 663) and other similar ones) that will be incorporated from the SH monitoring plans in Implementation/ Compliance, Biophysical, and Socio-Economic Monitoring Plans. 2. Scale: The 4FRI Stakeholder Group recommends that the scale of all (Implementation, Biophysical, and Socio-Economic) monitoring be clarified with respect to the scales of the effects analysis and the silviculture implementation plan (e.g., which monitoring indicators are appropriate for the analysis scale, or are we missing appropriately scaled indicators?). We recommend Table 142 be revised (see recent Stakeholder monitoring plan and tables included below) to more clearly link the analysis scales and monitoring scales. Table 142

Warner, Charles	Having reviewed your 4FRI plan, I commend the initiative to 'help' our forests. However, having witnessed/lived through hundreds of so-called prescribed burns, I can assure you that I am completely against these burns. The use of logging/mechanical thinning is the correct alternative. The FS and the logging industry need to learn to co-exist and work together. Prescribed burns (smoke) are NOT healthy for people (or animals for that matter). The forests are overgrown and yes they do need to be thinned, but in a manner that does not harm our health, that is, mechanical thinning with the use of some limited 'managed' fires.	(22-1) Thank you for your comment. Please see our response to letter #6 and #11. These responses provide details on other alternatives that were considered to address smoke emissions. These responses also address how the project would comply with the requirements set by the Arizona Department of Environmental Quality and use emission reduction techniques to reduce smoke emissions as much as possible.
Warner, Charles	Introduction Second hand smoke kills and creates lung, sinus and cancer problems for the human body, especially for the young and older. The Forest Service seems to be intent on caring for the Forests (as they probably should be) than worrying about the health consequences to humans (and probably animals as well). Smoke from these fires not only causes immediate issues to people, but to the entire planet as well. Green-house gases are reportedly changing our climate.	(22-2) Please see our responses to letter #6 and letter #11.
Warner, Charles	There are alternatives to burning the forests, namely mechanical thinning. The FS does not appear to be interested in working with Industry to provide this alternative	(22-3) Thank you for your comment. We considered an alternative that would have eliminated the use of prescribed fire and utilize other methods (DEIS, Eliminate the Use of Prescribed Fire, p.54). The alternative was considered but eliminated from detailed study because we determined that it would not meet various elements of the purpose and need (see DEIS, page 54-56). It would be possible to use mechanical treatments to move biomass offsite and reduce surface fuels that would have been burned and produced smoke. However, mechanical treatment would not replace the role fire has in improving vegetation composition and diversity on: (1) 59,391 acres of existing grasslands, (2) over 56,000 acres of ponderosa pine with a savanna or grassland reference condition, (3) grassland inclusions within 308,000 acres of ponderosa pine forested areas, (4) 5,261 acres of pine-sage, (5) 1,471 acres of aspen, and (6) thousands of acres where Gambel oak exists within the pine forest. Without the ability to use prescribed fire to: (1) stimulate understory vegetation growth, (2) reduce the natural surface fuels (that have accumulated since the interruption of fire on the landscape), and (3) maintain desired canopy base heights, canopy bulk densities, and reduced ladder fuel conditions (that were attained

		through mechanical treatment), it is estimated the project area would begin to move away from forest structure and pattern and resiliency desired conditions within 10 years of the mechanical treatment. The use of alternative fuels treatment methods in lieu of prescribed fire could provide reductions in fuels but would not meet the ecological need of a fire-adapted landscape. In the case of grazing, the level that would be needed to maintain the project area without fire would exceed forest plan allowable thresholds. Using grazing as a surrogate for prescribed fire would be contrary to the purpose and need which is designed to increase vegetation composition and diversity, and move toward improved soil productivity and watershed function. (DEIS, page 56). In summary, technically, it is possible to mow, hand thin, chip, masticate, hay, graze, rake or find other ways to remove biomass that would otherwise be burned and produce smoke. Practically speaking, however, it is not reasonable to treat the entire ~600,000 acres with those tools. Without fire, the effects of using only mechanical treatments would eliminate many of the ecological role/s of fire that are necessary and beneficial to healthy forests and watersheds in the 4FRI project area, and the risk of losing key components of the ecosystem from extensive areas of high severity fire will continue to increase. To the degree possible, landscape patterns and mosaics would have to be maintained mechanically and, over time, species composition would shift to species that are less fire tolerant (Fule and Laughlin 2007, Laughlin et al. 2011). Nutrients would increasingly become locked up in litter layers, and soil productivity would decline, affecting species composition and vegetative patterns (Moir 1988, Laughlin et al. 2011, Abella et al. 2007). No burning would require more frequent mechanical thinning, which would negatively affect soil and habitat (Covington et al. 2001).
Warner, Charles	as a matter of fact, when forced to issue a mechanical thinning contract, they apparently awarded to ex-FS personnel who were not prepared to accomplish the task (see Payson Globe article, dated May 22, 2012, entitled U.S. Forest Service Awards Historic Thinning Contract).	No response needed - opinion.
Warner, Charles	Discussion What is natural?? Are piles?? No. The piles are typically comprised of green/wet wood and doused with some type of propellant which ignites/keeps the piles burning. This format creates	(22-5) Thank you for your comment. Piles have only been used as a result of overcrowded forests resulting from unnaturally dense forest resulting from fire suppression. Piles are not burned when green. They

a lot of smoke. Nature rarely piles or uses gasoline/diesel fuel to ignite the forest. Natural is not a 'groomed' forest, but rather a mix of dense forests in some areas, 'cleared' areas in some and a density 'mix' in others. Second-hand smoke kills. A documented fact. Smoking within 50 feet of a government building is considered illegal, and yet, the FS pours tons of smoke on this same building. This does not compute. Either it is bad for us or it is not. Second-hand smoke should be avoided at all costs.

are given at least a year, sometimes several, to 'cure', often for the express purpose of decreasing emissions when they are burned. They are not doused with propellant. Well-constructed piles burn on their own after being ignited. They are never 'doused, as this would be expensive, unsafe, and an environmentally unsound practice. The intent of this project is not to have a groomed forest. The DEIS describes the purpose and need for the project as, "The purpose of the project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and disease, and climate change (FSM 2020.5). The project is expected to move almost 600,000 acres toward comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects" (DEIS, page 9). Regarding openness, the DEIS describes the desired condition as, "Overall, the desired condition is to reestablish non-forested openings that have been invaded by ponderosa pine since fire exclusion and reconfigure the forests toward their natural spatial pattern. At the fine scale, groups of trees would typically range from 0.1 acre to 1.0 acre in size. Tree group size would exceed 1 acre as needed to respond to site-specific conditions including the presence of presettlement trees or mature and mid-aged trees that are developing old tree characteristics. Tree groups in the mid-age and older structural stages (VSS 4, 5, and 6) would have canopies that provide moderate to closed conditions and where canopies are touching, or nearly touching, in order to provide connectivity for wildlife that are dependent on this type of habitat. There would be a mix of very open, open, moderately closed, and closed canopy conditions at the landscape (ponderosa pine vegetation) scale. Moderate to closed canopy conditions would be widely distributed on the landscape. Habitat for goshawk and MSO, steep slopes, and buffers for resources such as bald eagle roosts, other raptor nests, caves, and special designations that would not be treated (including wilderness and most research natural areas) provide connectivity with moderate to closed canopy conditions. At the

		landscape scale (extent of ponderosa pine vegetation), openness would range from very open (up to 90 percent) within the savanna and grassland matrix to closed (as low as 10 percent) on the highly productive forest areas to achieve a heterogeneous condition across the landscape" (DEIS, page 11). Also see our responses to letter #6 and letter #11.
Warner, Charles	Summary Over most of the past century the FS put fires out when they started. This was probably not the best option for the forests (and maybe considering how big some fires can get without some type of clearing maybe not even the best approach for people). BUT, the current approach is to continually burn which is very detrimental to the health of people. A better approach, in my estimation, is to use as much mechanical thinning as possible with some use of 'managed' fires in non-populated areas as well. If the real interest of the FS is the safety of lives and property, then maybe a heavy emphasis on mechanical thinning particularly around heavier populated areas would be advantageous. Additionally, instead of merely throwing more pollution into the air, let's get something back for all of that energy; namely, use the forest materials to create electricity by burning in generators. Our world climate is indeed changing due to greenhouse gases; it is in all of our better interests to eliminate as much pollution from our air as possible.	(22-6) Please see our response to comment 22-1. Overall, improving forest structure (including the use of fire) would produce more stable carbon than thinning alone. The expected effects on carbon emissions versus carbon sequestration are discussed on pages 222 – 226 of the Fire Ecology and Air Quality Report, and on pages 321 – 325 in the DEIS. We reviewed the titles of the newspaper articles that were part of the comment. The articles are considered popular press and display the various reactions to forest management actions that include the use of prescribed fire. No additional information that could clarify or improve the analysis was found in these submissions.
Warren, Barbara	This letter is in response to the request for Extension]public comment[auto-markup end] on the plan to carry out controlled burns in the Coconino National Forest, as a portion of 4FRI. Physcians for Social Responsibility has endeavored to prevent the effects of nuclear warfare and testing since 1962. The Arizona Chapter has been deeply concerned over the potential release of radioactivity and of mercury as a result of 4FRI, affecting the health of Arizonans. The following is background for these concerns:	(6-1) Thank you for your comment. A complete response which addresses how this analysis has addressed concerns can be found below (comment 6-5).
Warren, Barbara	Between 1945 and 1962, the US Government carried out over 200 above-ground nuclear bomb tests at the Nevada Test Site. Although these tests were planned with careful attention to wind conditions, there were a number of occasions on which the winds shifted and carried radioactive material into the upper third of Arizona, parts of Utah and New Mexico and, of course, Nevada. These areas, noted as "downwinder areas" were mapped, monitored and tested for	(6-2) Thank you for your comment. We are aware of concerns about the potential for radioactive particles being released from prescribed fires. No specifics were provided in the comment letter regarding the concern for mercury in emissions. The project will comply with air quality standards set by the EPA, as enforced by the Arizona Department of Environmental Quality (ADEQ). All burns must conform to the Federal Clean Air Act (individual state programs can be more stringent but not

radioactive contamination of soil and vegetation in 1985, and significantly high levels were identified in many parts of Northern Arizona, including Coconino and Kaibab National Forests. As a reuslt of the exposures of people to this radioactivity and legal actions, some 16,000 "downwinder" cancer victims of these exposures have received over $800,000,000.00 under the RECA (Radiation Exposure Compensation Act) Act of 1990, to this date. Furthermore, there have been significant forest fires in the areas near Los Alamos and the Chernobyl catastrophe. Measurements of the soil following the fires in these areas, and controlled labratory tests, have shown that radioactivity which had been taken up by the vegetation would be concentrated in the ash to as much as 40 times the level originally measures in the soil. Moreover, transfer of radionuclides such as Cesium-137 to the atmosphere, increasing with the temperature of the fires, has been documented at a rate of up to 40-70%. This atmospheric pollution, in addition to the concentrated ash, is then available for dissemination through aerosolization, seepage into water tables, and wind carried contamination, into the nearby acquifers. Such acquifers in the drainage of Kaibab and Coconino NFs, including numerous lakes and the Colorado River basin, supply drinking water to most of the population of Arizona. Such exposure would predicably result in further cancers, suffering, deaths, and consequent cost to the government. One of the major radioactive components involved is Cesium-137 which has a half-life of 30 years. The risk from this should be undetectable in antoher 200 years. Another, more difficult to measure but found to be present, is Plutonium, with a half-life of 24,400 years. The soils in these fallout areas have not been tested since 1985, according to the Library at the Nevada (Nuclear Weapons) Test Site. therefore, we simply do not know what the current levels of radioactive materials are.

less). The Clean Air act sets specific standards for six substances. These do not include radioactivity or mercury. Season, weather, topography, resources, and other factors play large roles in determining burn areas, extent, and timing. There are techniques to reduce smoke impacts during burning (e.g., favorable wind conditions, clearing around stumps and removing larger logs to avoid smoldering, removing slash from the site rather than burning it, etc.), and ways to reduce exposure, but it may not be possible to implement these in all cases. This may be particularly true as burning increases in volume and extent. In both project planning and implementation, we will do what we can to minimize the effects of smoke on communities, but it is likely there would be increases in the number of days of air quality impacts over current levels. The project would not exceed the levels allowed by the ADEQ. The Forest Service will continue to coordinate with adjacent landowners/agencies to limit emissions and burn on days when smoke can rise up and disperse, though it may settle into valleys overnight. The emission reduction techniques and other design features aimed at reducing emissions that would be followed during implementation are displayed in appendix C of the DEIS as FE1-FE3, FE 8-9 and FE15. The comment that included this statement, "Measurements of the soil following the fires in these areas…" was unsupported by any references. We were able to find three sources of data, in addition to working with the EPA to investigate the concern. See pages 84 and 85 of the Fire Ecology, Fuels, and Air Quality Report where we address the potential for smoke from prescribed fire treatments to contain radioactive substances. During the Cerro Grand fire of 2000, there was also considerable public concern regarding the potential release of radionuclides from the Los Alamos National Laboratory (LANL). The following risk summary is from "2002 Fact Sheet: Cerro Grand Fire Releases to Air". "The primary health risks during the Cerro Grande fire were associated with breathing materials released into the air. It was estimated the risk of cancer from breathing any LANL-derived chemical or radioactive material that may have been carried in the smoke plume to be less than 1 chance in 10 million. Potential exposures in the surrounding communities to LANL-derived chemicals that are not carcinogenic were about 10 times lower than acceptable intakes established by the U.S. Environmental Protection Agency (EPA). The risk

of cancer from breathing chemicals and radioactive materials in and on the natural vegetation that burned in the Cerro Grande Fire was greater than that from LANL derived materials, but still less than 1 chance in 1 million. The vegetation that burned contained naturally occurring chemicals and radioactive materials and radioactive fallout produced during atmospheric tests of nuclear weapons. These materials and the risks they posed are present during any forest fire. The evidence suggests that some adverse health effects did result from breathing high concentrations of particulate matter in the smoke. Such exposures are associated with any forest fire. Deposition of LANL-derived chemicals and radioactive materials from the smoke plume to the soil was minimal." Following the Cerro Grande fire that burned the city of Los Alamos and the Los Alamos National Laboratory (LANL) in New Mexico in 2000, the EPA, New Mexico Environment Department (NMED), and LANL partnered with Department of Energy to operate radiological monitoring systems as well as to initiate several studies to assess the impacts of the fire. The results of these efforts with regard to air quality and human health impact indicated that radionuclides originating from the LANL site during the Cerro Grande Fire were restricted to naturally occurring radionuclides. LANL, the Department of Energy, and NMED monitored radionuclide concentrations in smoke from the Las Conchas fire that burned through the Los Alamos area in the summer of 2011 and reported no significant detection levels (http://www.nmenv.state.nm.us/aqb/WildfireSmokeResources). A study that included Lockett Meadow, within the EIS analysis area, found levels of radioactive materials in the soil were no different than background levels, and would provide no added human health risk (Ketterer et al. 2004, Graham 2012a).Communication with the EPA (Gerdes 2012, Graham 2012a), and studies that addressed these emissions (Schollnberger et al. 2002) indicate that radioactive isotopes and other undesirable chemicals are present in wildfire emissions. Some are naturally occurring chemicals that have always been present at some level in wildfire smoke and some have resulted from the weapons testing that occurred in the mid-20th century. At the level of exposure the public is subjected to, radionuclides do not pose as great a risk as wildfire. Radioactive material that may be carried in the smoke plume carries a risk of human health concerns of less than 1 chance in 10

million (NMED 2002, Graham 2012a) and the greatest health risk is from breathing high concentrations of particulate matter in the smoke." This report is available in the project record with the fire ecology report. In addition to the discussion above, the USFS, working with the Arizona Department of Environmental Quality, the Arizona Department of Health Services, the Arizona Radiation Regulatory Agency, Arizona Emergency Management, and with additional input from the Center for Disease Control and the Environmental Protection Agency produced an FAQ sheet specifically to address concerns about the implementation of prescribed fires under 4FRI, and concerns about radioactivity. Conclusion: No additional analysis is required. Mercury is out of the scope of this project. The project will comply with the Clean Air Act (CAA) as regulated by the ADEQ. Mercury is not covered under the CAA. Although an assessment of radioactivity is not required by the CAA as part of an emission analysis, the DEIS (page 166 to page 173 of the web-based DEIS) and FEIS chapter 3 addresses the topic. In response to comments on this concern, experts at the Environmental Protection Agency (Region 9), the Agency's liaison to the Arizona Department of Environmental Quality, and the Agency's Washington Office were contacted in order to consider the best available information. Overall, after reviewing available literature (Selin 2009, Obrist et al. 2008, Biswas et al. 2007,Wiedinmyer and Friedli 2007, Friedli et al. 2003) and consulting the Environmental Protection Agency (Jason Gerdes, personal communication 3/11/2014) and the Agency's Washington Office Air Quality lead (Peter Lahm, personal communication 3/11/2014) and the USFS's liaison to the Air Quality Division of the Arizona Department of Environmental Quality (Ron Sherren, personal communication 3/11/2014). Information available for analyzing the potential for mercury emissions as a result of prescribed fire is considered to be incomplete and unavailable relevant to determining reasonably foreseeable adverse impacts to the human environment as directed by CEQ Sec. 1502.22 (b) 1.

Warren, Barbara

It seems absolutely critical that these tests be repeated to determine present day levels before 4FRI is begun. If safe areas are found, controlled burning could be used. Where there is a hazard, many alternative and safer means may be used to decrease the danger of uncontrolled wildfire, which has created severe damage in Arizona in

(6-3) Please see the previous response. Testing is not required by EPA or ADEQ and has not been added to this project. The recommendation is considered to be beyond the scope of this project.

	the past few years.	
Warren, Barbara	Clear-cutting, while preventing fires, destroys the very resource we are trying to protect. Much better solutions include controlled and selective logging. News reports indicate that this is planned, but include subsequent burns which would produce the effcts mentioned. Further means include chipping of undergrowth and increased grazing by cattle and goas. The latter have been successful in California. In contrast to burning, all these methods can actually produce income from the area	(6-4) Regarding an alternative that would utilize grazing, the DEIS includes a discussion on an alternative that was considered but eliminated from detailed study (web-based DEIS, page 54 to 56). The summary concludes, "This issue would resolve Issue 1, prescribed fire emissions. It would be possible to use mechanical treatments to remove biomass offsite and reduce surface fuels that would have been burned and produced smoke. However, mechanical treatment would not replace the role fire has in improving vegetation composition and diversity on; (1) 59,391 acres of existing grasslands, (2) over 56,000 acres of ponderosa pine with a savanna or grassland reference condition, (3) grassland inclusions within 308,000 acres of ponderosa pine forested areas, (4) 5,261 acres of pine-sage, (5) 1,471 acres of aspen, and (6) thousands of acres where Gambel oak exists within the pine forest. Without the ability to use prescribed fire to: (1) simulate regeneration and growth of native herbaceous understory vegetation, (2) reduce the natural surface fuels (that have accumulated since the interruption of fire on the landscape), and (3) maintain desired canopy base heights, canopy bulk densities, and reduced ladder fuel conditions (that were attained through mechanical treatment), it is estimated the project area would begin to move away from forest structure and pattern and resiliency desired conditions within 10 years of the mechanical treatment. The use of alternative fuels treatment methods in lieu of prescribed fire could provide reductions in fuels but would not meet the ecological need of a fire adapted landscape. In the case of grazing, the level that would be needed to maintain the project area without fire would exceed forest plan allowable thresholds. Using grazing as a surrogate for prescribed fire would be contrary to the purpose and need which is designed to increase vegetation composition and diversity and move towards improved soil productivity and watershed function.
Warren, Barbara	In conclusion, it is imperative that testing for residual radioactive deposits in soil and vegetation be conducted BEFORE the fire program is initated, to avoid the unintended consequences of very significant and widespread health hazards. Unintended consequences have previously resulted both from the "Smoky Bear" program and the original atomic testing which produced RECA. If	(6-5) Please see the previous responses. Testing is not required by EPA or ADEQ and has not been added to this project. The recommendation is considered to be beyond the scope of this project.

	carried out as presently planned, the 4FRI can produce problems for many years to come.	
Watson, Margaret	This is terrible news. Why can't they just leave nature alone...Why is this the only way to destroy valuable land where animals live and let loggers in for the take...Shame on us for all this destruction and killing of nature. When are we as a society going to Wake Up and Stop this insanity of not using common sense and letting higher powers take over, What will it take to stop this madness? Greed and Power are destroying our country.	(91-1) Thank you for your comment.
Weibel, Annemarie	This type of project is going on all over the country. The Four Forests Restoration Initiative ("4FRI") is the largest project yet proposed, totaling more than two million acres in central and eastern Arizona. I understand that you want to replace the unbroken forest with "a mosaic of inter spaces and tree groups"; eradicate most of the Ponderosa pines, which you considers a "weed"; and do this by thinning and burning one million acres of Arizona forest, including 98% of protected habitat for the Mexican Spotted Owl. In order to permanently alter the landscape, you plan to burn every area of the forest every five years, from now on. Before you burn the first time, however, you will invite a logging company from Montana down to harvest 300,000 acres of trees. I oppose your restoration initiative.	(143-1) Thank you for your comment.
Welker, Richard	I say, NO to the logging. NO to the burning. NO to the destruction of protected habitat. NO to the release of yet more CO2 to the already overburdened atmosphere that is already carrying far more carbon then the climate can endure without severe generational consequences. NO to using our taxpayer dollars to degrade a world already in overshoot and far beyond its carrying capacity. NO to the politicians who are pushing this scheme for their own short term profit. NO to the wanton destruction of our children's heritage. NO to the slice and dice mentality of breaking up the forest into "manageable pieces." And NO to this all being done every five years. Common sense says there is a better way. It is an insult to anyone's intelligence that we have to destroy an entire ecosystem in order to save it. We are acting like there is no tomorrow, and indeed, there won't be if we keep this up in the name of constant growth and industrialization. I vote NO on the entire project.	(85-1) Thank you for your comment. Please page 8 of the DEIS for the purpose and need for the restoration treatments.
Westcott,	Please accept these comments on the Four Forests Restoration	(111-1) Thank you for your comments. Please see our response to letter

Mary	Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially	#19.

	important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
White, Tom	Apache County is located in eastern Arizona along the Mogollon Rim that marks the southern edge of the Colorado plateau.Apache County has been a stakeholder in the effort to develop and implement landscape scale forested ecosystems restoration for the last decade and has been involved in the creation of the White Mountains Stewardship Project; the Governor's Forest Health Council's Statewide Strategy for Restoring Arizona Forests; the collaborative Analysis of Small-Diameter Wood Supply in Northern Arizona; and, what has become the Four Forest Restoration Initiative. Apache County appreciates the opportunity to comment on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative, and would like to offer the following comments, gap analysis and suggested actions. For ease of reading, Apache County comments have been organized in chapter form, and a table of contents is inserted on the following page to facilitate the navigation of the document.	(184-1) Thank you for your explanation of where the 4FRI project is in relation to Apache County and for taking the time to comment.
White, Tom	Apache County Apache County ("the County") is located in eastern Arizona along the Mogollon Rim that marks the southern edge of the Colorado Plateau. Four characteristics of the County are particularly relevant to the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative ("the 4FRI DEIS"): 1)One of the four national forests regrouped into the Four Forest Restoration Initiative ("4FRI"), the Apache-Sitgreaves National Forests, is located within Apache County. 2)The landscape scale catastrophic wildfires in the national forests of the Southwest have a disproportionately large impact on the ecological, social and economic life of Apache County and the neighboring eastern Arizona counties, and on the health and safety of their residents and visitors. Four of the five largest wildfires in Arizona, including two of the largest wildfires in the nation, have occurred within the five counties of the Eastern Arizona Counties Organization in the last decade: the Rodeo Chediski Fire of 2002 that consumed 460,000 acres; the Willow Fire of 2004 that burned 120,000 acre; the Cave Creek Complex Fire of 2005 that blazed through 244,000 acres and the Wallow Fire of 2011 that charred	(184-2) Thank you for your time and attention.

White, Tom	538,000 acres. 3)Outdoor recreational activities conducted in the 4FRI national forests, such as, but not limited to, camping, motorized recreation, hunting, fishing, hiking, etc. by the local residents, and by visitors to the County recreating from metro Arizona to the Rim Country, have a disproportionately large impact on the economic well-being and the economic development of the County. 4)The County has made a long term commitment to proactively participate in, assume leadership roles in and provide political support at the state and federal levels for forest restoration and wildfire prevention efforts at local and landscape scales, such as the White Mountain Stewardship Project and the Four Forest Restoration Initiative that the County has been instrumental in creating and fostering. Apache County has been uniquely involved in: Developing the concept of industry funded landscape scale restoration in Arizona; Fostering the collaborative agreement that resulted in the 4FRI project; Organizing the political support at the state and federal levels that made 4FRI possible; Lobbying for the funding of landscape scale restoration in general, and 4FRI in particular, through the Collaborative Forest Landscape Restoration Program (CFLRP); and, Resolving regulatory issues with the U.S. Department of Agriculture (USDA) and the U.S. Forest Service Washington Office (USFS WO), such as the cancellation ceiling issue, which hindered the implementation of industry funded landscape scale restoration.	(184-3) Thank you for your comment.
White, Tom	Apache County, therefore, understands particularly well the issues at hand, the management processes engaged, the desired future conditions, and the difficulties and challenges involved. The County appreciates fully the USFS 4FRI Team's intent to: i) ensure an adaptive management planning and implementation process that is inclusive, efficient, collaborative and science-based to promote healthy, resilient, diverse and productive national forests and grasslands; ii) support natural resources-based rural economic development and employment; and, iii) ensure the enjoyment of the 4FRI national forests by the current and future generations in a balanced approach of preservation, conservation and sustainable exploitation of the natural resources. In a spirit of continuous improvement, and based on the direct practitioner knowledge and experience gained through a uniquely long, diverse, often productive	(184-4) Thank you for your time and attention.

	and sometimes difficult participation in the Forest Service planning and implementation processes, Apache County would like to share its comments, its appreciation for the obvious work put into the 4FRI DEIS, and its concerns and suggestions as follows. Role of Apache County in the 4FRI DEIS Process Apache County recognizes that the 4FRI DEIS is a Forest Service-driven technical process, and generally supports the analysis mechanisms deployed by the USFS 4FRI Team to complete the assessment and the technical part of the planning. Although Apache County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as an organization representing the most direct and local expression of democratic government at the individual district or national forest level, the County more generally defines its role at the policy-making level as it relates to public lands management processes. Therefore, although several of the following comments do apply to the technical aspects of the 4FRI planning processes, they purposefully do not address specific technical mechanisms thereof, and Apache County is mostly satisfied that the USFS methodology is generally satisfactory, and that the studies that the USFS 4FRI Team in their expertise deem reliable, are adequate to support their technical conclusions (Lands Council v. McNair 537 F.3d 981 - 9th Cir. 2008). Therefore, Apache County will focus its engagement in the 4FRI DEIS process, and its comments and suggestions, at the policy-making level and on whether the 4FRI Preferred Alternative contributes to the County's residents' and visitor's enjoyment, custom, culture, health, safety and economic well-being. The County will further focus its engagement on whether the 4FRI Preferred Alternative is consistent with the objectives of the County as expressed in its plans and policies; on how the 4FRI project impacts related planning efforts by the County; and, on the compatibility with and interrelated impacts	
White, Tom	of the 4FRI project and the County's plans and policies. Per the requirements contained in the 2012 Planning Rule, Title 36 - Parks, Forests, And Public Property, Part 219 - Planning, Subpart A -	(184-5) Thank you for your comment. (184-6) Thank you for referencing the 2012 Planning Rule. This project has been reviewed against the direction in the current Coconino
White, Tom	National Forest System Land Management Planning, Section 4 -	National Forest Plan (forest plan), as amended (USDA 1987), the Land

White, Tom	Requirements for public participation, subsection (b) Coordination with other public planning efforts, Apache County expects that: "The responsible official shall coordinate land management planning with the equivalent and related planning efforts of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments" (36 CFR 219.4 (b)(1)). Apache County further expects that: "The results of this review shall be displayed in the environmental impact statement (EIS) for the plan", and that "this review shall include consideration of: (i) The objectives of federally recognized Indian Tribes, Alaska Native Corporations, other Federal agencies, and State and local governments, as expressed in their plans and policies; (ii) The compatibility and interrelated impacts of these plans and policies; (iii) Opportunities for the plan to address the impacts identified or to contribute to joint objectives; and, (iv) Opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives" (36 CFR 219.4 (b)(2)). Apache County posits that these statutory requirements are meant by Congress to imply more than a perfunctory review process resulting in a check mark in a 'coordination box' and imply a sincere and proactive resolution effort to reduce and resolve potential conflicts between aspects of 4FRI DEIS and objectives expressed in the County's plans and policies; such as, but not limited to, those relevant to forested ecosystems restoration and catastrophic wildfire prevention objectives, watersheds restoration objectives, rangelands resources management objectives, or forest products resources management objectives. Apache County is committed to resolve or reduce potential conflicts between the 4FRI DEIS and the County's plans and policies, and understands that such resolution must take place within the context of developing the 4FRI project's desired conditions or objectives. To this effect, it is the intent of Apache County to avail itself of the opportunity contained in the 2012 Planning Rule that specifies that: "Where appropriate, the responsible official shall encourage States, County, and other local governments to seek cooperating agency status in the NEPA process for development, amendment, or revision of a plan" (36 CFR 219.4 (a)(1)(iv)).	and Resource Management Plan for the Kaibab National Forest, as revised (USDA 2014) and 36 CFR 219.17(b)(3). For clarification, this project has proposed three nonsignificant forest plan amendments for the Coconino NF. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b)(3) provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. The comments from the Eastern Counties Organization (ECO), as well as other comments received during the official comment period, have been read, reviewed, and discussed by the 4FRI specialists. A summary of responses by topic will be part of the FEIS. The complete individual comment analysis will be posted on the project's website and filed in the project record. The Forests have collaborated with 4FRI stakeholders and interested publics including the Eastern Counties Organization. The DEIS (chapter 1) and FEIS (chapter 1) documents how collaboration was used during the planning process.
		(184-7) In 2011 the Arizona Game and Fish Department (AGFD) was designated a cooperating agency. The AGFD provided wildlife data and wildlife analysis support for this project-level environmental analysis (DEIS, Chapter 1).

White, Tom	The County's policy making decisions and management actions are guided by the County plan. This plan guides the actions of the Board of Supervisors and the County staff toward meeting the present and future enjoyment, custom, culture, health, safety and economic well-being needs of the County's residents or visitors. The County planning effort integrates the principles of: 1)Monitoring the effects and impacts of the implementation of the County policies, as well as the direct, indirect, individual and cumulative effects and impacts on the County and its residents and visitors of the policy decisions and management actions taken by state and federal agency partners; 2)Monitoring all demographic, social, economic, cultural and other variables, whether internal or external, which are relevant to the County's policy making decisions and management actions; and, 3)Dynamic and generally informal adaptive management. As such, the County plan is an evolving dynamic plan that constantly adapts, often informally, in response to the evolving ecological, economic, social and cultural environment, and that is formulated as much through the regular deliberations of the County's Board of Supervisors and the resulting Resolutions of the Board, as it is in the formal planning documents. For the purpose of compliance with the statutory requirements of coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), the County plan defined as the accumulation of the formal County planning documents and the County public record of Board of Supervisors deliberations and resolutions, is hereby entered into the 4FRI NEPA record.	(184-8)Thank you for your comments. All comments received on this project have been filed in the project record.
White, Tom	Apache County appreciates and supports the extensive and thorough analysis performed by the USFS 4FRI Team for the 4FRI DEIS, and the discussion of the effects of the no action alternative and the three action alternatives on: Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; Transportation; Climate Change; Short-term Uses and Long-term Productivity; Unavoidable Adverse Effects; Irreversible and Irretrievable Commitments of Resources; and, Cumulative Effects. Multiple resources analyzed individually by the	(184-9) Thank you for your explanation of how the resources were regrouped for ECO's analysis of the 4FRI DEIS.

USFS 4FRI Team in the 4FRI DEIS are regrouped in a smaller number of overarching natural resources management policy objectives by the County. In no particular order, the County's natural resources management objectives relevant to the 4FRI DEIS comments include: 1)Rangelands Resources Management Objectives. Rangelands Resources Management Objectives address issues such as, but are not limited to, grazing availability, suitability, sustainability; ecological, economic and social carrying capacity; access; contribution to rural economic development; and, contribution to local Western custom and culture. 2)Forest Products Resources Management Objectives. Forest Products Management Resources Objectives address issues such as, but are not limited to, logging availability, suitability, sustainability, productivity, access; contribution to rural economic development; and, contribution to rural Western custom and culture. 3)Mineral and Energy Resources Management Objectives. Mineral and Energy Resources Management Objectives address issues such as, but are not limited to, the availability, suitability, sustainability, productivity, access, and contribution to rural economic development of (a) solid, liquid or gaseous mineral resources and (b) solar, wind, hydropower, geothermal and other natural renewable energy resources. 4)Motorized Travel and Recreation Management Objectives. Motorized Travel and Recreation Management Objectives address issues such as, but are not limited to, motorized access; motorized travel; motorized big game retrieval; motorized dispersed camping; motorized gathering of firewood; motorized access to dispersed fishing; motorized recreation opportunities; inventoried roadless areas; wilderness area designation; motorized access to grazing and logging opportunities; contribution of motorized access, recreation and travel to rural economic development; and, contribution to local Western custom and culture. 5)Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives. Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives address issues such as, but are not limited to, protection of County's residents and visitors; protection of collective and individual real properties; protection of transportation, energy and water collection and distribution infrastructures; ecological

	restoration of forested ecosystems; local scale restoration projects; landscape scale restoration projects; social license required for the non-conflictual and non-litigious implementation of restoration efforts (such as the one requested in public statements by former USFS Southwestern Regional Forester Corbin Newman for the Four Forest Restoration Initiative); industry development required to implement and fund restoration efforts through economically viable utilization of the wood products; and, long term guarantees of wood supply necessary to attract private investments in a small diameter utilization infrastructure in northeastern Arizona. 6)Watershed Restoration Objectives. Watershed Restoration Objectives address issues such as, but are not limited to, ecological restoration of watersheds; protection and development of water collection and distribution infrastructures; monetization of watershed ecosystem services; downstream consumption contribution to upstream production investments and maintenance; and, interactions between watershed functions and multiple use functions. 7)Management Areas Designation Objectives. Management Areas Designation Objectives address issues such as, but are not limited to, the nomination, designation, and management of (a) inventoried roadless areas (which are technically not management areas per se but are an administrative designation) and (b) wilderness areas, primitive areas, research natural areas, wildlife quiet areas, and wild and scenic rivers; and, effects on socioeconomic resources and impacts on the other County objectives. Apache County understands that some of these objectives are not directly relevant to the 4FRI DEIS inasmuch as, for example, the 4FRI alternatives are not contemplating the designation of management areas. However, most of these objectives are relevant to the 4FRI DEIS, inasmuch as the 4FRI alternatives either have direct effects on some County's objectives, such as Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives; Forest Products Resources Management Objectives; Watershed Restoration Objectives; and, Rangelands Resources Management Objectives; or, may have indirect effects on some County's objectives, such as Motorized Travel and Recreation Management Objectives.	
White, Tom	For the purpose of compliance with the statutory requirements of	(184-10) Thank you for your comment. Please see response # 184-6 for

	coordination between the 4FRI EIS and the County's objectives as expressed in its plans and policies (36 CFR 219.4 (b)), this document: Apache County comments on the Draft Environmental Impact Statement for the Four-Forest Restoration Initiative is hereby incorporated into the County's expressed plans and policies. Apache County, therefore, expects that: i) the Responsible Official shall coordinate land management planning with the County equivalent and related planning efforts (36 CFR 219.4 (b)(1)); ii) the consistency review and coordination action shall include consideration of the objectives of the County as expressed in its plans and policies; and, iii) the Responsible Official shall consider opportunities to resolve or reduce conflicts, should some arise between the 4FRI DEIS and the County's objectives (36 CFR 219.4	the relevant planning rule under which the 4FRI was initiated.
White, Tom	(b)(2)).	(184-11) 13) Thank you for your comments. We have collaborated with the counties since the project was initiated. Since the counties have been part of the 4FRI stakeholder group, we have considered comments received from all publics, including the stakeholders.
		(184-12) Thank you for your comments. All comments received on the draft EIS from Federal, State and local agencies have been included in appendix I of the FEIS on pages 925 to 994. This satisfies Section 102 (c) of NEPA which states, comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public. Although the project only directly affects Coconino County, comments from the Eastern Arizona Counties Organization has been included to reflect similar comments received from Apache, Gila, Graham, Greenlee and Navajo County. Per 40 CFR 1503.4, summarized responses to comments received on the draft EIS are included in this appendix. They have been organized by topic. All comments received on the draft EIS are available for public review at: https://cara.ecosystem-management.org/Public/Letter/172405?project=34857. All comments received were reviewed and responded to individually. The complete comment analysis and response document is located in the project record and is available on the project's website at: http://www.fs.usda.gov/main/4fri/planning.
White, Tom	Per the requirements of 36 CFR 219.4 (b)(2), 40 CFR 1502.16(c) and 40 CFR 1506.2, Apache County hereby requests that the results of the consistency review and coordination action between the 4FRI DEIS and the County's objectives as expressed in its plans and policies shall be displayed in the Four Forest Restoration Initiative Environmental Impact Statement.	
White, Tom	Apache County appreciates and supports the fact that all three action alternatives include a clear priority for restoration treatments (PDEIS p. 62).	(184-13) Thank you for your comment. For clarification, the DEIS was not programmatic but site-specific. We assumed the (PDEIS) reference in this comment was to a programmatic document.
White, Tom	Apache County recognizes that the issues of forested ecosystem	(184-14) Thank you for this information.

	restoration and forest products management are fundamentally different, and are typically not discussed simultaneously in ecosystems non-departed or little departed from characteristic reference conditions. However, as the Forest Service and the County both generally acknowledge: current conditions in the forested ecosystems and especially in the ponderosa pine and dry or wet mixed conifers-dominated forests of eastern Arizona are considerably departed from reference conditions, and at risk of continued uncharacteristic disturbances such as landscape scale catastrophic crown fires or insect infestations. Also, Apache County acknowledges and appreciates the efforts made by the Forest Service, and particularly the Arizona national forests, to pioneer larger scale restoration efforts such as the White Mountains Stewardship Project. The County has been and continues to be supportive of the White Mountain Stewardship Project and of its funding as a practical tool to initiate larger scale treatments and to incentivize the creation of a small diameter trees utilization infrastructure. Simultaneously, the County acknowledges that the model of subsidized restoration treatments is not scalable at landscape level, as is required to restore the forests of Arizona, for lack of agency funding. As proposed in the Four Forest Restoration Initiative, an initiative that the County was instrumental in creating, fostering and developing, landscape scale forest ecological restoration appears currently feasible only if it is funded by the economically viable utilization of the forested byproducts of restoration by private industry. While it is actually not a novation when it comes to forest products, as timber sales have been for centuries an established form of natural resources valuation and have funded the management of the resources, the concept of ecosystem services monetization is relatively new to the discussion of ecological restoration funding, and its full implications are still being tested. As a consequence, Apache County suggests that both the County and the USFS 4FRI Team operate under a very specific constraint when it comes to forest restoration, inasmuch as the forest products industry in Arizona is the funding mechanism for landscape scale	
White, Tom	restoration in eastern Arizona, which imposes the concept of social	(184-15) Thank you for this information.

	acceptability or 'social license' for appropriate scale industry to fund restoration logging activities at the landscape scale throughout the 4FRI project. Apache County's Forested Ecosystems Restoration and Catastrophic Wildfire Prevention Objectives for the upcoming planning cycle include, among others: 1)Design and implement landscape-scale, consensus-based, industry-supported, accelerated community protection and forested ecosystems restoration in the 2.4 million acre ponderosa pine and mixed conifer-dominated forests of the Mogollon Rim. 2)Develop and sustain the social license required by Southwestern Regional Forester Corbin Newman as a prerequisite to the implementation of industry-supported landscape scale restoration. 3)Participate actively in the NEPA process, as a member of the public and as a Cooperating Agency, and provide robust comments to the Forest Service to ensure NEPA process integrity and survivability in the face of potential threats of litigation. Emphasize with the Forest Service a strategy of risk mitigation and focus on the end goal of accelerated restoration over partisan debates and exclusive focus on technical sciences to the detriment of social science and social license. 4)Create in eastern Arizona the wood supply conditions for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 5)Wherever and whenever possible, prioritize forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona with	
White, Tom	multiple industrial scale new investments.	(184-16) Thank you for this information.
White, Tom	Apache County appreciates and supports the fact that all three action alternatives include a clear focus on mechanical restoration treatments yielding forest products (PDEIS p. 62).	(184-17) Thank you for your comment. As noted, the DEIS socioeconomic analysis (web-based DEIS, pp. 272-284) evaluated the direct and indirect economic output for each alternative.
White, Tom	The inherent challenge faced by Apache County and the USFS 4FRI	(184-18) Thank you for your comment.

	Team is that the priorities typically considered when managing forest products, such as a sustained yield of harvest volumes on a regulated non-declining even-flow basis for the long term, uneven age structures, long term sustained yield capacity (LTSYC), non-declining allowable sale quantity (ASQ), etc., are augmented and complicated, and to a large extent superseded, by the overwhelming priority to complete landscape scale restoration as rapidly as possible for fear of massively disruptive landscape scale catastrophic crown fires and/or landscape scale insect or disease infestations. Owing to the fact that for the foreseeable future green forest products will likely be byproducts of restoration treatments, and green forest products will likely continue to be at risk of destruction by catastrophic fires if landscape scale restoration is not expeditiously implemented, the County suggests that forest products management actions for the upcoming planning cycle must be dictated not only by traditional silviculture science and best practices, but primarily by the absolute priority of implementing landscape scale restoration as expeditiously as possible using mechanical treatments that produce the forest products necessary to not only sustain the existing forest industry in the White Mountains, but also to allow robust natural resources-based rural economic development through the creation of an entirely new infrastructure of small diameter trees utilization at industrial scale. Apache County's Forest Products Resources Objectives for the upcoming planning cycle include, among others: 1)Create in eastern Arizona the wood supply conditions necessary for private industry investments in a new economically viable small diameter trees and residual biomass utilization infrastructure capable of funding the initial ecological restoration thinning of at least 50,000 acres of ponderosa pine and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 2)Sustain in the White Mountains the wood supply conditions necessary for the continued development and growth of the existing local industry, with expanded economically viable small diameter trees and residual biomass utilization facilities capable of funding the initial ecological	
White, Tom	restoration thinning of at least 15,000 acres of ponderosa pine	(184-19) Thank you for the information.

	and/or mixed conifer-dominated forests annually for the next 20 years, then the maintenance of the desired future conditions in subsequent decades. 3)Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for sustained yield of harvest volumes on a regulated, non-declining even-flow basis for the long term, to the overriding priority of implementing as expeditiously as possible landscape scale restoration based primarily on mechanical treatments producing forest products. 4)Subordinate for as long as required in the upcoming planning cycle the scientific silviculture priorities and traditional forest products management methods for uneven age management to the overriding necessity of sustaining the social license required to implement landscape scale restoration expeditiously and in a non-conflictual and non-litigious manner, as relates to the protection of old growth and the retention of large trees (upcoming old growth) where vegetative structural stages (VSS) 5 and 6 are deficient at stand or forest scale.	
White, Tom	Apache County appreciates and supports the analysis performed by the USFS 4FRI Team using the Watershed Condition Framework (WCF) to identify 6th level Hydrologic Unit Code (HUC) Class 1 (Functioning), Class 2 (Functioning-At-Risk) and Class 3 (Impaired) watersheds in the 4FRI project area, and to analyze the direct and indirect effects of the 4FRI project on water quality and water yield.	(184-20) Thank you for the information.
White, Tom	Uncharacteristic landscape scale forest crown fires in eastern Arizona have a demonstrated negative impact on the conservation and operation of the watersheds in which they occur. In addition to the damages caused to communities and ecosystems by the fires themselves, the most common negative effects on watersheds documented after the Rodeo-Chediski Fire, the Wallow Fire, in some areas, and the Schultz Fire, among others, are: uncharacteristic runoffs, catastrophic flooding, accelerated and aggravated soil erosion, streams and reservoirs sedimentation, and long term severe disturbance of the watershed functions.	(184-21) Thank you for your comment.
White, Tom	The Rim Country constitutes a large portion of the watersheds that contribute significantly to the water supply of the metro Arizona and greater Phoenix area. The threat of additional uncharacteristic landscape scale forest crown fires in eastern Arizona, especially on	(184-22) Thank you for your comment.

	the south slopes of the Mogollon Rim, raises serious concerns about the conservation and operation of the eastern Arizona watersheds. Additionally, the specific risk to the East Clear Creek watershed poses an existential threat to the Town of Payson's water supply. With the growing realization that uncharacteristic landscape scale forest crown fires affect the conservation and operation of the watersheds in which they occur, efforts to protect watersheds have recently been initiated in the Southwest. Several of these efforts focus on the monetization of the ecosystem services provided by the watersheds, and on an attempt to enroll the financial contribution of the downstream beneficiaries of the services (water consumers in this case) to the financial costs of protecting the upstream provider areas and the utility corridors delivering the services (forests, watersheds and water collection and distribution infrastructures at risk of catastrophic fires in this case). Such efforts were pioneered by the Denver Forest to Faucet project in Colorado, or the Santa Fe Municipal Watershed Protection project in New Mexico, among others. In Arizona, with the active contribution of Apache County, an effort to create the Arizona Watersheds Investment Fund (AWIF) is underway, and in Flagstaff, Ballot Question #405 received electors' approval in November 2012 for the issuance of a $10 million municipal bond to finance the restoration treatments of high threat areas in the Rio de Flag and Lake Mary watersheds to provide greater protection to the community from the impacts of fires and floods. Therefore, the restoration of forested ecosystems, ponderosa pine and mixed conifer-dominated, in the watersheds of the Mogollon Rim in general, and specifically in the East Clear Creek watershed, is an objective priority, among other areas in eastern Arizona also in need of restoration treatments, for Apache County, after the direct protection of communities and infrastructures. Apache County's Watershed Restoration Objectives for the upcoming planning cycle include, among others: 1)Prioritize restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures, on the slopes of the Mogollon Rim in general, and specifically in the East Clear Creek, Verde River, Little Colorado River,	
White, Tom	Upper Gila River, and Upper Salt River watersheds. 2)Develop the	(184-23) Thank you for your comment.

	Arizona Watersheds Investment Fund (AWIF), and/or similar initiatives in order to fund restoration treatments that cannot be funded by the wood industry utilization of the forest byproducts of restoration in areas where the merchantable material yield is insufficient for mechanical treatments to be economically viable, or access by mechanical harvesting equipment is restricted, such as in steep slopes, high erosion areas, riparian areas, etc. 3)Develop in parallel and in a complementary manner all models of watersheds restoration funding such as industry funding, ecosystem services funding, municipal bonds funding, etc. Apache County appreciates the addition of grassland restoration treatments to forestland treatments in Alternative C, the Preferred Alternative. The County believes that this addition is significant not only because it implies the restoration of approximately 50,000 acres of rangelands, but because it aptly diversifies the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer	
White, Tom	'landscape restoration.' Apache County's Rangelands Resources Objectives for the upcoming planning cycle include, among others: 1)Restore encroached grasslands, including the most departed semi-desert, Great Basin, and montane subalpine grasslands that have been invaded by trees (subalpine grasslands) and shrubs (semi desert and Great Basin grasslands) by removing trees and shrubs where economically feasible, promoting a mixture of native perennial grass species, implementing the periodic prescriptive use of mixed classes of livestock matching animal feeding habits with specific plant material, and reintroducing a regime of cool surface fires in order to reduce trees and shrubs colonization and erosion hazards, and to increase livestock forage production. 2)Adopt management practices that discourage the establishment of nonnative species and eradicate invasive weed species that have little to no forage value, recognizing the fact that the ecological or economic consequences of different exotic species are not all the same, and that the persistence of some nonnative species that are not necessarily undesirable or controllable, such as Kentucky bluegrass or Bermuda grass, may be	(184-24) Thank you for your comment.
White, Tom	beneficial from a socioeconomic perspective and a balanced	(184-25) Thank you for this information.

White, Tom	management for multiple resource objectives. 3)Allocate grass reserves on an allotment-by-allotment basis through proper range management, rather than on a district-by-district basis, which requires additional financial considerations for improvement maintenance. 4)Shift the grassland management process from the concept of balancing livestock grazing with available forage - which only addresses stocking rate - toward the concept of managing the intensity, frequency, seasonality, duration and classes of livestock grazing to accomplish the rangelands resources management objectives. 5)Emphasize adaptive management of the rangelands using a three step rangelands resources management monitoring approach of quantitative monitoring using standard measurements such as stocking rate, ground cover, etc.; qualitative monitoring using measurements such as species composition, age, nutritional value, etc.; and, effectiveness monitoring using outcome measurements such as range health, soil water holding capacity, soil organic content, livestock weight gain, wildlife indicator species, etc., in order to measure whether the management actions produce the site specific and cumulative direct and indirect effects desired. 6)Integrate the scientific research and implement the science-based recommendations developed by rangelands resources management experts and scientists. 7)Preserve the contributions of the rangelands resources to the economic development and the custom and culture of the rural Arizona counties. Apache County would like to preface any subsequent comment by the following four preliminary comments: 1.The quality and thoroughness of the work exhibited by the USFS 4FRI Team in the 4FRI DEIS is outstanding. Apache County is fully conscious of the fact that an enormous commitment was made and delivered upon by the USFS 4FRI Team, and that a legitimate pride of ownership must rest with the authors of the DEIS, as well as the Specialists' reports and other documents not published with the 4FRI DEIS but nonetheless part of the 4FRI project record. The County urges the USFS 4FRI Team to consider the County's comments NOT as a critic of their work, but as a goodwill effort toward continuous improvement of the 4FRI EIS, and as a proactive effort by the County to disclose its objectives, plans and policies, and the rationales that support them, to facilitate	(184-26) Thank you for your review and comments. Your concerns and suggestions have been noted in the specific responses to the comments which follow.

the statutorily required consistency review, coordination action and conflict reduction regarding potential discrepancies between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and as discussed in this document. 2.Strategically, Apache County overwhelmingly supports the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the following suggestions. Therefore, the following concerns and suggestions are not aimed at questioning the need to implement 4FRI but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process, which could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project as intended by the County. 3.Apache County readily acknowledges that several of the following comments and suggestions have already been addressed and agreed upon by the USFS 4FRI Team in the course of the work conducted by the DEIS Review Workgroup of the 4FRI Stakeholders Group with the USFS 4FRI Team. Also, considering the participation of the County in both the 4FRI Stakeholders Group and the DEIS Review Workgroup, there is a high probability that there will be some level of repetition and redundancy between the County's comments and the 4FRI Stakeholders Group comments, as well as comments from other stakeholders. Nonetheless, the NEPA process calls for comments on the DEIS as published, and for the formulation of the County's concerns and suggestions, regardless of whether these are echoed in other comments or not. 4.As previously noted, although Apache County retains and employs many talented individuals at the peak of the knowledge curve in their respective fields, the County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Rather, as a body representing the most direct and local expression of democratic government at the individual district or national forest level, Apache County more generally defines its role at the policy-making level as it relates to public lands management processes. Apache County, therefore, believes that it is appropriate to comment at the programmatic level, from a Forest Service perspective, and at the objectives level, from a County's policy perspective.

White, Tom	For clarification, Apache County wants to emphasize that although it generally supports the use of Best Available Scientific Information (BASI) for management decision, it does not support the exclusive use of technical sciences to formulate policies or to make strategic decisions that have an important impact on people. The County believes that these decisions must integrate social sciences in the decision making process. For example, the County believes that while there is no overwhelming supporting science on either side of the long debated issue of a universal diameter cap for restoration treatments (whether it be 9", 12", 16" or 18"), analyzing the issue of a diameter cap from just a technical science perspective is at best incomplete, because the issue of large trees retention is not only a technical issue, but also a social issue that cannot be adequately addressed by an exclusively scientific approach. Therefore, Apache County comments will purposefully not emphasize technical issues of silviculture, such as uneven aged composition, regeneration openings, etc., but will be focused on what the County believe to be the crux of the successful and timely implementation of the overriding priority of landscape scale scientifically and socially acceptable - if admittedly imperfect - ecological restoration and catastrophic wildfire prevention. Namely: *Social acceptability of proposed treatments; *Speed of completion of landscape scale restoration; and, *Prioritization of treatments.	(184-27) Thank you for your comment. We used the best available science when developing the purpose and need and analyzing the effects of each alternative. What constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, the NEPA document should identify methods used, reference scientific sources relied on, discuss responsible opposing views, and disclose incomplete or unavailable information, scientific uncertainty, and risk. See 40 CFR, 1502.9 (b), 1502.22, 1502.24 (USDA FS 2007). In the DEIS, an alternative was considered but eliminated from detailed study that would have limited mechanical treatments to 8-inch d.b.h. This alternative was based on the assertion that crown fire can be effectively addressed with mechanical treatments that do not cut trees larger than 8 inches d.b.h. Small diameter mechanical tree cutting would be used to establish tree groups, nonforested openings (interspaces), and move toward a balance of tree age and size classes. Prescribed fire would be used to reduce litter and other surface fuels, stimulate herbaceous understory vegetation, prepare sites for natural ponderosa pine regeneration, and maintain interspaces. This alternative would partially address Issue 2, conservation of large trees, since mechanical treatments would be curtailed at 8-inch d.b.h. It would not achieve restoration desired conditions. It would resolve Issue 3, post-treatment canopy cover and landscape openness, since only small-diameter trees would be removed. However, approximately 73 percent of the 507,839 acres of ponderosa pine within the project area would not move toward forest structure and pattern desired conditions. Of all the even-aged stands, 47 percent (VSS 4), 8 percent (VSS 5), and 1 percent (VSS 6) would remain even-aged. There would be zero percent movement toward desired conditions in uneven-aged VSS 4 through VSS 6. For these reasons, this alternative was considered but eliminated from detailed study. The DEIS documents an alternative considered but eliminated from detailed study that would incorporate the 4FRI stakeholder group-created Large Tree Retention Strategy (LTRS, or also referred to as the Old Growth Protection and Large Tree Retention Strategy) as written. A modified version of the original strategy, the Large Tree

Implementation Plan, or LTIP, was included in alternatives C and E. Table 15 in the DEIS displays a few excerpts from the original LTRS, the location of the excerpts in the LTRS, a crosswalk to the modified LTIP, and rationale why the original language was not accepted as written. For these reasons it was considered but eliminated from detailed study.

White, Tom	Alternative A, the no action alternative, does not offer the option of continuing an existing management approach to landscape scale forested ecosystems restoration in eastern Arizona inasmuch as there is currently no such approach. Alternative A would nonetheless result in the mechanical treatment of approximately 87,000 acres, and in the prescribed fire treatment of approximately 143,000 acres over the next five years (DEIS p. 62). However, the scale and pace of these management actions are incompatible with the urgent need to implement landscape scale restoration as identified in the purpose and needs for the 4FRI NEPA process. Therefore, Apache County wants to communicate unambiguously to the USFS 4FRI Team its opposition to Alternative A. Apache County understands the NEPA requirement for the 4FRI DEIS to analyze a no action alternative, and the County acknowledges and appreciates the existence of constituencies favoring no action. However, Apache County cannot support an alternative that would result in the continuation of an unmitigated high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Apache County is concerned that Alternative A is in direct conflict with the County's objectives as expressed in its plans and policies. Suggested action Apache County regrets to suggest that there is no possible corrective action to mitigate the incompatibility of Alternative A with the County's objectives as expressed in its plans and policies, or to resolve or reduce the conflict between Alternative A and the County's objectives as expressed in its plans and policies. Alternative A is so departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Apache County's natural resources management objectives, that it does not warrant any further discussion from the County's perspective.	(184-28) Thank you for your comment. We agree that alternative A (no action) would not meet the purpose and need for landscape-scale restoration as described in the purpose and need (DEIS, pp. 8-29).

White, Tom	Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) both generally meet the purpose and needs of landscape scale restoration in eastern Arizona, as analyzed by the USFS 4FRI Team, and the County. For all practical purposes, Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative) share many similarities: 1.The acreages treated, both mechanically and by fire-as-a-first-entry (approximately 388,000 acres treated mechanically and 588,000 treated with fire in Alternative B; and, approximately 434,000 acres treated mechanically and 593,000 treated with fire in Alternative C) are very similar; and, 2.The differences in acreage treated mostly result from the addition of grassland treatments to forestland treatments in Alternative C. Nonetheless, there are some differences between Alternative B (the original Proposed Action) and Alternative C (the Preferred Alternative): 1.The addition of grassland treatments to forestland treatments in the Preferred Alternative is significant inasmuch as it diversifies aptly the concept of landscape scale restoration from a restrictive interpretation of 'forested ecosystems restoration' toward a broader concept of truer 'landscape' restoration; 2.The increase in mechanical treatments upper limit from 16" to 18" diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) in the Preferred Alternative, while relatively minor from a treatments perspective, is likely to have an impact on the social acceptability of the proposed treatments; 3.The integration of some reworded components of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) in the Preferred Alternative is likely to have an impact on the social acceptability of the Preferred Alternative; and, 4.The integration of research projects in the Preferred Alternative is a welcome addition. Apache County clearly views the addition of grassland treatments to forestland treatments in Alternative C as a positive step toward meeting the County's Rangelands Resources Management Objectives, and generally supports the integration of research projects into restoration implementation projects, wherever and whenever feasible. The County further supports the integration of stakeholders-developed strategies and foundational documents such as the Old Growth	(184-29) Thank you for your comments. See the DEIS page 58 to 61 for more information regarding why the original large tree implementation strategy was modified. A modified large tree implementation plan was included in the DEIS in appendix D.

	Protection and Large Trees Retention Strategy (OGPLTRS) in the 4FRI DEIS. Conversely, Apache County is concerned that the adaptation of the stakeholders-developed Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) into the USFS 4FRI Team Old Trees Implementation Plan (OTIP) and Large Trees Implementation Plan (LTIP) may have an impact on the social acceptability of the Preferred Alternative, as further discussed in the later sections Old Growth and Large Trees. Therefore, Apache County generally supports the concepts presented in Alternative C, the Preferred Alternative, provided that it is further refined per the suggestions offered in the County's comments, as well as comments from other stakeholders critical to the viability of the 4FRI social license. However, Apache County is concerned that some decisions made by the USFS 4FRI Team may compromise the social license developed for the implementation of the 4FRI project. Consequently, Apache County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by some decisions made by the USFS 4FRI Team that may compromise the social license developed for the implementation of the 4FRI project, present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its	
White, Tom	plans and policies and in these comments. Apache County respectfully suggests that the USFS 4FRI Team and the Responsible Officials exercise careful judgment in their decisions, in relation to: i) the true material importance of the issues, as opposed to their symbolic or emotional importance; and, ii) the potential effect of litigation on the implementation of the 4FRI project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' recommendations, and the major benefits attached to sustaining the	(184-30) Thank you for your comments. (184-31) Thank you for your suggestion. The Forest Supervisors will be reviewing all responses to the issues.
White, Tom	4FRI social license. Alternative D is identical to Alternative B (the Proposed Action) as regards mechanical treatments. It is also identical to Alternative C (the Preferred Alternative) as regards mechanical treatments, except for the minor difference of upper limit of diameter at breast height	(184-32) Thank you for your comment. Please note alternative D was developed to respond to concerns people had with prescribed fire emissions. That is why the alternative would reduce the use of prescribed fire by about 69 percent when compared to alternatives B
White, Tom	(d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO	and C. Although the alternatives may appear to be the same (with the

PACs). The critical difference between Alternative D and Alternatives B and C is the use of fire as a treatment. In alternative D fire would be used on only approximately 179,000 acres, compared to 588,000 acres in Alternative B and 593,000 acres in Alternative C. Apache County is concerned that the drastic reduction in the use of fire as a thinning treatment in Alternative D could prevent the timely completion of landscape scale restoration on the Mogollon Rim within the next 20 years as intended with the 4FRI project. The County favors, wherever and whenever possible, prioritizing forest byproducts treatments (mechanical treatments) funded by economically viable utilization, over non-byproducts treatments (fire as first entry thinning treatments) in order to create and sustain the wood supply necessary for a new era of forest products industry-based economic growth and employment in eastern Arizona, with multiple industrial scale new investments. However, the County also recognizes that industry funded mechanical treatments are not appropriate in many sensitive areas such as steep slopes, fragile soils, riparian areas, etc., or in areas where the merchantable yield of restoration treatments would be economically unviable. Further, Apache County acknowledges that agency funded mechanical treatments or hand thinning are disproportionately expensive as compared to fire thinning, and the County appreciates that, as discussed in a different context but still related to the implementation of 4FRI treatments in the Apache-Sitgreaves National Forests Land Management Plan PDEIS: "the alternatives were realistically designed to reflect anticipated budgets and workforce capabilities," and "none of the alternatives would actually treat enough acres fast enough to fully reach desired conditions within the first 5 decades" (A/S PDEIS p. 440). The use of fire as a treatment tool is, therefore, not a luxury from a timeline, economic or practicality perspective, but is instead a necessity. Additionally, the County believes that the ecological role of fire is absolutely critical to the long term ecological sustainability of the forested ecosystems of the Southwest, and that a management alternative that would reduce unduly the use of fire could compromise, in the long term, the implementation of post-treatment maintenance burns. In consequence, Apache County wants to communicate

exception of the acres of prescribed fire), the effects in terms of creating a resilient forest is very different. In the FEIS, we have clarified the key ecological differences between the alternatives, see table 33 of the FEIS and chapter 3, environmental consequences.

	unambiguously to the USFS 4FRI Team its opposition to Alternative D. Apache County understands the NEPA requirement for the 4FRI DEIS to analyze significantly different alternatives, and the County acknowledges and appreciates the existence of constituencies concerned with prescribed fire emissions, and who favor alternatives such as Alternative D. However, Apache County cannot support an alternative that could reduce the scope and significantly slow the pace of landscape scale restoration in eastern Arizona, which could result in the unnecessary prolongation of a high risk of further landscape scale uncharacteristic disturbances such as catastrophic high intensity crown fires, or insect infestations, for the forests of eastern Arizona and their communities. Consequently, Apache County is concerned that Alternative D is not compatible with the County's objectives as expressed in its plans and policies. Suggested action Apache County is concerned that there may not be a corrective action to mitigate the incompatibility of Alternative D with the County's objectives as expressed in its plans and policies. Alternative D is too departed from the Mogollon Rim residents' and visitors' past, current, and foreseeable future custom, culture, safety and economic well-being needs, and from Apache County's natural resources management objectives, to warrant further discussion from the County perspective.	
White, Tom	Notwithstanding any of the above, Apache County is concerned about the three action alternatives and the range of alternatives that they represent. Specifically, even though Apache County recognizes differences between the three action alternatives as discussed in the previous sections Alternatives B and C and Alternative D, the County is concerned that the mechanical treatments in each of the three action alternatives are similar enough in scale, scope and intensity that the DEIS may not offer an actual range of alternatives when discussing mechanical thinning. Arguably, the difference of upper limit of diameter at breast height (d.b.h.) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs) is minor, and the addition of grassland treatments in Alternative C or the reduction of fire treatments in Alternative D do not affect forestland mechanical treatments per se. Apache County itself is generally satisfied with the mechanical treatments proposed in alternatives B, C and D,	(184-33) Thank you for your comment. The Agency is required to: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act (40 CFR 1501.2(c)) . The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed (36 CFR 220.5(e)). Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (40 CFR Section 1502.14). The phrase "range of alternatives" refers to the alternatives discussed in environmental

	provided these treatments are refined to integrate the suggestions of the County and other stakeholders integral to the 4FRI social license. However, the County is concerned that the 4FRI DEIS could be perceived as a DEIS based on a single alternative of mechanical treatments, with non-significant variations between the three action alternatives. Therefore, Apache County is concerned that the 4FRI DEIS may fail to comply with the Council on Environmental Quality (CEQ) requirements to provide and analyze a range of alternatives (Sec. 1505.1 (e) and Sec. 1502.14 (a)) and that the absence of a broader range of analyzed mechanical treatments alternatives may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a broader range of analyzed mechanical treatments alternatives, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them (40 CFR Section 1502.14). The DEIS (page 62) included 9 alternatives including no action, three action alternatives and five alternatives that were considered but eliminated from detailed study. The alternatives responded to the issues received from the public (2011 Scoping Report, project record). In response to comments received on the DEIS, a fourth action alternative that would propose no forest plan amendments was analyzed in the FEIS. This increased the number of fully analyzed alternatives to five (four action alternatives and the no action alternative), and increased the number of alternatives considered but eliminated from detailed study to six. More important than the actual number of alternatives, is whether unresolved issues have been addressed through alternative development or environmental analysis. The range of alternatives considered by the responsible officials includes all reasonable alternatives to the proposed action that are analyzed in the document, as well as other alternatives eliminated from detailed study.
White, Tom	Apache County respectfully suggests that the USFS 4FRI Team request a third party legal review of the NEPA and CEQ requirements in, and of the 4FRI DEIS compliance with, Sec. 1505.1 (e) and Sec. 1502.14 (a).	(184-34) Thank you for your recommendation.
White, Tom	The degree of canopy openness in the immediate post-treatment conditions and in the long term desired future conditions has for several years been an issue of debate among the 4FRI stakeholders and the 4FRI collaborative group, including the USFS 4FRI Team, and is likely to remain one. This issue is linked to the discussion of whether vegetative structural stages (VSS) and canopy closure should be measured at group level, as proposed in the 4FRI DEIS, or at stand level, as currently implemented under the Coconino National Forest Plan. Amending the Forest Plan will resolve the technical compliance issue, but it does not address the more fundamental question of whether guidelines originally designed to be implemented at stand or even forest scale (outside Mexican Spotted Owl protected areas) are directly transferable, or not, to groups within stands. Additionally, the creation of interspaces between groups, in addition	(184-35) Thank you for your comments. The issue of openness is addressed in the DEIS (appendix D, implementation plan) on pages 610, 613-614, 616, 620-624, 627, 629 and 632-635. For example, page 616 states, "Interspace would occupy approximately 25 to 40 percent of the area; Interspace width between tree groups would average from 25 feet to 60 feet with a maximum width of 200 feet." Table 118, on page 618 displays the percent of area occupied by interspace ranges from 10-70 depending on treatment type and intensity. The implementation plan (DEIS Appendix D) included a variety of designs that utilize a "read the land" approach. For example, pages 616, 619, 622, 624, 629, 632, and 634 addressed design. Overall, the average group size would vary depending on site quality, existing stand structure, and pre-settlement tree evidence. Table 139 includes guidance on the placement of tree groups, interspace, and regeneration openings. The placement would

to the creation of regeneration openings within groups, will undoubtedly result in a significantly lower canopy density than was deemed desirable in the Management Recommendations for the Northern Goshawk in the Southwestern United States. Clearly, the USFS 4FRI Team has endeavored to be responsive to this concern, as evidenced in the 4FRI DEIS Appendix G Bridge Habitat, Appendix D Alternative B through D Implementation Plan, and in the silviculture Specialist Report. However, Apache County is concerned that the issues raised by partner agencies such as the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department, and by a broad range of stakeholders, have not yet been fully resolved. Questions remain about how and at what scale post-treatment canopy openness will be measured, and how group size, basal area (BA), stand density index (SDI), interspaces, regeneration openings, trees per acre (TPA), and quadratic mean diameter (QMD) interrelate to result in a trajectory toward desired future conditions. As previously noted, Apache County does not generally define its role in the public lands management process as a role of science provider or resources technical specialist. Further, the County readily admits that it lacks the technical competence to contribute meaningfully to the resolution of arcane technical issues such as density management and the relationship between treatment intensity, tree group density, and overall average density, as relates to the implementation of post-treatment openness. Suffice it to say that the very fact that the discussion continues unabated is concern enough to the County that a zone of agreement has not been reached, or that the issues have not been understood clearly and broadly enough for the emergence of a general zone of agreement.

vary depending on existing conditions. Along with the design, table 140 (DEIS page 654) emphasizes that interspace, regeneration openings, tree group density, and overall density need to be considered together as opposed to individual entities in order to achieve the desired conditions. This concept is further highlighted in figure 74 (DEIS, page 657) by disclosing the confines at which tree group stocking can be managed in order to achieve a sustainable and resilient forest. For treatments that prescribe interspace and regeneration openings, adjustments to interspace width (and therefore tree group size), and the amount of regeneration openings, may be made during implementation to ensure tree group density remains outside of the red zone density. Group stocking in VSS 4, 5, 6 in goshawk habitat is designed to meet forest plan canopy cover requirements (Coconino NF forest plan) and desired conditions (Kaibab NF forest plan). The amount of regeneration openings that would be implemented is a combination of existing and created regeneration openings that would achieve 10 to 20 percent of the landscape within a treatment area. If there is regeneration on the landscape (existing condition) it would be accounted for and site specific treatments would not be designed to create regeneration. What is existing on the site would dictate the treatment. The stocking guide includes a red zone for the purpose of displaying how the prescriptions would not allow for remaining in or moving into the red zone. For example, 20 percent would be the maximum in the red zone. The project would manage for 10 percent of that. We would adjust the regeneration rate to keep out of the red zone. We would manage for less regeneration openings based on what is on the ground. There may be some sites where regeneration openings would not be put in because it would put us into the red zone stocking. This would be determined on site. In response to comments on the DEIS, additional clarifications regarding the creation of regeneration openings have been made. The implementation plan now emphasizes that when outside of the wildland urban interface (WUI) restoration treatments in goshawk habitat would focus on the removal of small diameter trees and would emphasize large trees retention to move towards deficit stand structure, were applicable. This would be accomplished by placing an emphasis on creating regeneration openings and interspace in areas where vegetation structural class 3

and the smaller VSS 4 trees dominate. The placement of tree groups reserved for retention would focus on areas where the largest trees are already aggregated. These groups would generally range between 0.25 and 1 acre in size. This would result in stands being composed of larger tree groups intermixed with relatively small openings. In stands with a preponderance of large young trees the treatment intensity would be managed to the lower end of the available spectrum. Management in these stands still recognizes the need to create regeneration openings to be able to promote uneven aged stand conditions. The FEIS includes analysis which displays the effects on restoration objectives when adequate interspace and regeneration openings cannot be created (alternative E). This analysis is derived from the silviculture report. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover would be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

White, Tom

Apache County understands that differences of opinions will exist regarding desired canopy openness. What concerns the County is the confusion that exists about questions that should be answered with data, such as: Does science support the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups (within stands)? How does canopy openness measured at group level compare with the reference condition? How and at what scale will post-treatment openness be measured in 4FRI? Does a range of basal area of 50 to 70 in the largest treatment categories provide enough flexibility for a full range of treatments, considering other metrics such as trees per acre (TPA), stand density index (SDI), percentage of interspace, and

(184-36) Please see the response to #184-35. Regarding wildlife habitat, we have included a summary of post-treatment openness in chapter 2 of the FEIS (summary of effects table). Post-treatment openness, with a summary of effects, been provided for Mexican spotted owl and goshawk. Also see appendix G of the FEIS.

White, Tom	percentage of openings? How will habitat be provided to closed canopy and high closed canopy dependent species in the post treatment interim between the thinning of their current habitats and the natural development of high and dense canopy cover in the future old growth? Therefore, Apache County is concerned that the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, may be both a process risk and a social license risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk and social license risk for the 4FRI DEIS potentially caused by the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Apache County respectfully suggests the USFS 4FRI Team provide a clear and compelling analysis: 1.Presenting the science or, if science is lacking, the reasoning backing their decisions to transfer the canopy density guidelines originally designed to be implemented at stand or even forest scale, to groups; 2.Answering specifically the stakeholders' questions regarding the assumptions made in Appendix G Bridge Habitat (for example: percentage of openness at stand level including interspaces and regeneration opening; percentage of existing old growth in old growth allocations; relative higher density of canopy in MSO and goshawk habitats post plan amendments; etc.); 3.Providing qualitative and quantitative 'visual' descriptions of post treatment objectives, including relative proportions and actual sizes of groups, stands, openings, etc., for each treatment type; and, 4.Explaining clearly how openness will be measured post treatments, how it will be monitored, how the monitoring data will trigger adaptive management, and at what thresholds.	(184-37) Thank you for your comment. Please see the response to #184-35.
White, Tom	As discussed above, and as analyzed in the 4FRI DEIS, forest plans amendments are technically required for 4FRI to be implemented under the current forest plans of the Coconino and Kaibab national forests. These amendments essentially address management actions (mechanical treatments up to 16" or 18" d.b.h., and low-intensity prescribed fire) in the Mexican Spotted Owl Protected Activity Centers (MSO PACs); and (a) resolve the issues of desired percentage	(184-38) Thank you for your comments. In the DEIS, amendments for both the Coconino NF and Kaibab NF were analyzed and determined to be site-specific, nonsignificant forest plan amendments (DEIS, pp. 439-564). . The significance of each amendment was evaluated in accordance with FSH 1926.51 and FSH 1926.52 (DEIS, Appendix B). This topic was added to chapter 1 in the FEIS as a procedural concern. In response to comments on the DEIS, an alternative that proposes no

of interspace within uneven-aged stands; (b) add the interspace distance between tree groups; and, (c) add language clarifying where canopy cover is and is not measured to facilitate restoration in goshawk habitat (excluding nest areas). The amendments also remove the cultural resource standard that requires achieving a "no effect" determination, and allow for a "no adverse effect" determination. The amendments further remove language referencing monitoring of Mexican Spotted Owl Protected Activity Centers (pre- and post-treatment, population, and habitat), and defer to the U.S. Fish and Wildlife Service the monitoring and design of the treatments in Mexican Spotted Owl protected habitats. Apache County understands the technical necessity of amending the forest plans and has no specific issue with the concept. However, the County is concerned about the decision of the USFS 4FRI Team to characterize the amendments as non-significant, and to defer 4FRI projects design and monitoring in Mexican Spotted Owl protected habitat to the U.S. Fish & Wildlife Service, without including the U.S. Fish & Wildlife Service monitoring plan and guidelines for projects design in the 4FRI DEIS. The Forest Service Manual provides guidance in Sec. 1926.52 Changes to the Land Management Plan That are Significant as follows: "2) Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period." In the USFS 4FRI Team's own analysis in Appendix B Forest Plan Amendments: "The canopy cover portion of the amendment would affect 139,308 acres (18 %) of all goshawk habitat on the Coconino NF and about 35 % of goshawk habitat within the project area" (DEIS p. 466); and: "The amendment would affect approximately 20 % of all suitable goshawk habitats on the forest and about 27 % of goshawk habitat within the project area" (DEIS p. 482). It is unclear to Apache County if there is an official percentage threshold for significance in the Forest Service regulations, but it seems that the common understanding of the word 'significant' - "a noticeably or measurably large amount" (Merriam Webster) - would include 35 % of goshawk habitat within the project area in the Coconino National Forest, or 27 % of goshawk habitat within the project area in the Kaibab National Forest. Citing

forest plan amendments for the Coconino NF (alternative E) was developed. The purpose of the alternative is to allow the public another way to compare and contrast environmental consequences between alternatives. It also (partially) responds to the significance topic. In alternative E, treatments in MSO PAC habitat would be restricted to 9 inch d.b.h. (current Coconino NF forest plan direction). The basal area in threshold habitat would remain 150. There would be no prescribed fire use in MSO PAC core areas. In goshawk habitat, there would be no savanna treatments and there would be no clarification language that describes the relationship between interspaces and canopy closure. Since the DEIS was issued in 2012, a revised Kaibab NF Forest Plan became effective (USDA FS 2014). All forest plan amendments for the Kaibab NF have been removed from the FEIS because the alternatives are consistent with the revised Kaibab NF forest plan The project's desired conditions for ponderosa pine were based on the best available science for the restoration of southwestern fire-adapted ecosystems (RMRS GTR -310). These desired conditions informed the Kaibab NF's plan revision process. The amendments for MSO were removed because the project is consistent with the forest plan in that a guideline for threatened, endangered and sensitive species directs projects to integrate management objectives and protection measures from approved recovery plans (KNF forest plan, p. 51). With design features and mitigation, alternatives B through E are consistent with forest plan objectives, desired conditions, standards and guidelines, although movement towards desired conditions varies by alternative. Kaibab NF forest plan consistency evaluations are located in each resource report. A consolidated evaluation is in the project record. Three nonsignificant amendments for the Coconino NF were evaluated in the FEIS. The proposed forest plan amendments are authorized via 36 CFR 219, the Forest Service Planning Rule. Section 219.17(b)(3) of the Rule provides the transition language that allows this project to propose amendments to the Coconino NF forest plan using the provisions of the 1982 Planning Rule. All amendments are a specific, one-time variance for the Coconino NF restoration project. Once the project is complete, current forest plan direction would apply to the project area. The language proposed does not apply to any other forest project. The purpose of amendment 1 is to bring the alternative in alignment with the revised

these two percentages as precisely the reason why "For this reason, location and size (were) determined to be non-significant" (DEIS p. 466 and p.482) seems questionable, unless guided by an agency guideline, in which case a reference would be useful. Additionally, it is unclear how the canopy cover portion of the amendments would affect only 35 % and 27 % of goshawk habitat respectively, although the County speculates that it is related to higher vegetative structural classes (VSS). Further, Apache County is generally comfortable that habitat restoration and reduction of fire risk are key to improving Mexican Spotted Owl (MSO) habitat quality and, therefore, are aligned with both the current Coconino and Kaibab forest plans, as amended, and the U.S. Fish and Wildlife Service's (USFWS) revised MSO recovery plan (2012). However, the County is concerned that deference of treatments design to another agency (USFWS) without integrating this agency's proposed treatments, or at least guidelines, in the 4FRI DEIS makes it impossible for the 4FRI DEIS Team to analyze the site specific and the cumulative effects of the treatments. Therefore, Apache County is concerned that the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the inclusion of a USWFS monitoring plan or treatments guidelines, and without the possibility to analyze their effects in the 4FRI DEIS, may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the characterization of the forest plans amendments as non-significant, and the deferral of monitoring and treatments design to the U.S. Fish and Wildlife Service, without the possibility to analyze their effects in 4FRI, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

MSO Recovery Plan (USDI FWS 2012) and defer monitoring to the FWS Biological Opinion that is specific to this project. Amendment 2 clarifies existing direction related to managing canopy cover and interspace in the forest plan. The purpose of amendment is to bring the project into alignment with the best available science (RMRS-GTR 310) that provides desired conditions for restoring fire-adapted ponderosa pine in the Southwest. Amendment 3 resolves a forest plan error related to the management of heritage resources and is specific to this project. The detailed significance analysis for each amendment is located in appendix B of both the DEIS and FEIS. Amendments 1 through 3 were evaluated in accordance with the significance amendment criteria in FSM 1926.51 and FSM 1926.52. The significance analysis for each amendment included in the selected alternative is displayed in appendix B of both the DEIS and FEIS. No amendment alters multiple use forest plan goals and objectives, adjusts management area boundaries or management prescriptions. The changes in standards and guidelines are considered to be minor because they reflect the latest, best available science (RMRS-GTR 310). The amendments bring the alternatives into alignment with the revised MSO Recovery Plan, although the degree of alignment varies by alternative. No amendment would alter the long-term relationship between levels of multiple-use goods and services originally projected for the Coconino NF. These outputs were specific to a planning period ranging from 10 to 15 years (as identified in 1987). In the preferred alternative (alternative C) Amendment 1: The amendment would affect 6,906 acres or 18 percent of MSO PAC habitat on the Coconino NF. Amendment 2 is a clarification amendment. The canopy cover portion of the amendment would generally affect 137,242 acres (15 percent) of all goshawk habitats on the Coconino NF. Managing 28,653 acres of ponderosa pine for an open reference condition would affect approximately 3 percent of all suitable goshawk habitats on the Forest. Amendment 3 is specific to the 355,707 acres of proposed treatments in this project. The amendment would affect about 20 percent of the Coconino NF (which totals 1,821,495 acres). For these reasons, the amendments would not result in an important effect to the entire land management planning area. Each amendment is a specific, one-time variance for this restoration project. The best available science for management in Southwestern forests

		(RMRS GTR 310), the (Coconino NF) forest plan revision process, is affecting ongoing and future analyses. The plan amendments that are specific to this project do not impose direction on ongoing or future analyses. Some commenters stated the project amendments would impose direction for other ongoing and future vegetation projects. We reviewed the list of vegetation projects that were included in comments on the DEIS. Overall, the forest plan amendments that have been proposed in other vegetation projects reflect the ongoing Coconino NF forest plan revision process, using the best available scientific information (RMRS-GTR-310), and being compliant with the revised MSO Recovery Plan (USDI FWS 2012). A complete analysis of other proposed forest plan amendments by project is located in the project record. In the FEIS, all amendments have been updated to reflect changes in acres (see Changes from DEIS to FEIS in chapter 2 of the FEIS).
White, Tom	Apache County respectfully suggests that the USFS 4FRI Team request a third party legal review of the Forest Service Manual requirements in, and of the 4FRI DEIS compliance with, Sec. 1926.52 as relates to a determination of non-significance.	(184-39) Thank you for your recommendation.
White, Tom	Apache County further respectfully suggests that U.S. Fish and Wildlife Service monitoring plan and guidelines for the design of treatments in Mexican Spotted Owl protected habitats be incorporated into the 4FRI DEIS, and that their expected direct and indirect site specific effects be analyzed, presented, and integrated into the cumulative effects analysis.	(184-40) Thank you for your recommendation. At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting

White, Tom	The adaptation of the stakeholders-developed single document Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) by the USFS 4FRI Team resulted in two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Large Trees Implementation Plan (LTIP) is discussed in the following section Large Trees. Clearly, the focus of the 4FRI stakeholders on old growth protection has been integrated by the USFS 4FRI Team in the 4FRI DEIS. Section C Old Trees Implementation Plan of Appendix D Alternative B through D Implementation Plan captures the essence of the stakeholders' old growth protection strategy: "Old trees would not be cut for forest health issues or to balance age or size class distributions" (DEIS p. 644). Apache County also observes that, as required in order to comply with the forest plans, old growth allocation in the 4FRI DEIS meets the 20% minimum requirement for vegetative structural stage (VSS) 6 Old Forest; and Appendix D Section B Decision Matrix for establishing tree groups, interspace, and regeneration openings, preserves trees with old tree characteristics. However, Apache County observes that, past the affirmative statements in the 4FRI DEIS, the actual field decisions are left open to individual judgment. While "human health and safety" (DEIS p. 644) should be a fairly objective criteria, "additional habitat degradation" may be more open to interpretation, as illustrated in Section C Old Trees Implementation Plan itself where the example of prevention of additional habitat degradation involves … road construction! Further, Apache County also observes that the 4FRI DEIS states that "most sites (allocated to old growth) currently do not fully meet the minimum criteria for old growth conditions as listed in the forest plans" (p. 15). Considering that the purpose of allocating acres to old growth forest is to manage these acres for the fastest possible growth of existing trees toward	range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. (184-41) Thank you for your comments. The DEIS included specific treatment designs that manage for the sustainability of old trees in appendix D (implementation plan) on pages 613-629, 631-637, 639 to 641. Examples of treatment design include: "Treatments are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Treatments would follow the old tree implementation strategy and old trees would not be targeted for cutting. Live conifer trees with existing cavities, dead tops, and lightning scars would also be favored for retention"□ (page 627). Page 627 of the plan also states, "Retain all pre-settlement trees and the largest post-settlement trees that most closely resemble old trees in size and form as replacement trees adjacent to pre-settlement tree evidences at a 1:1 ratio. Some younger trees would also be retained to maintain uneven-aged structure. A higher leave tree to evidence ratio may be required to maintain the desired tree cover range□." The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape. Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be

	VSS 6, there is a high likelihood that mature large trees in VSS 5 may be thinned in order to reduce competition for VSS 6 candidates. This decision also involves personal interpretation and individual judgment calls which may prove socially acceptable or disastrous based on the individual making the decision. Therefore, Apache County is generally satisfied with the Old Trees Implementation Plan (OTIP) and old growth management objectives stated in the 4FRI DEIS, but remains concerned that its implementation may be a social license risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible social license risk for the 4FRI DEIS potentially caused by a misguided implementation of the Old Trees Implementation Plan (OTIP), may present a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.
White, Tom	Apache County respectfully suggests that the USFS 4FRI Team include strict and restrictive guidance regarding the possible removal of old growth, including a maximum number of trees removed according to appropriate metrics such as possibly: per 10 acre block, per mile, per project, or similar. Large trees	(184-42) Thank you for your suggestion. However, the intent of the project is to retain all pre-settlement trees unless there are public health and safety issues. See response to comment #184-41.
White, Tom	Large trees are particularly precious inasmuch as they represent the 'future old growth' necessary to restore the forests of eastern Arizona to an ecologically sustainable condition, and to provide habitat to dense and high canopy dependent species. The old growth 'allocation' requirement of 20% in the forest plan, as discussed in the previous section Old Growth, is a 'paper' allocation and should not be confused with the 'actual' old growth that exists in the lower single digit percentage across the forests, numerically far below the required 20% - or even 10% - and temporally far removed from reaching the required 20%. The deficit of actual vegetative structural stage (VSS) 6 Old Forest is what makes vegetative structural stage (VSS) 4 and 5 Mid-age Forest and Mature Forest important. This reasoning guided Apache County when it participated to the	(184-43) The DEIS included specific treatment designs that manage for the sustainability of large trees in appendix D (implementation plan) on pages 610-614, 616, 618-620, 622-627, 629-630, 632 and 634. The vegetation analysis disclosed post treatment impacts to old and large trees on pages 140 of the DEIS: "Restoration treatments proposed in alternatives B, C, and D are designed to manage for old age trees in order to have and sustain as much old forest structure as possible across the landscape." Old trees would not be targeted for cutting. Reference the old tree implementation plan in appendix D of the DEIS. The analysis presented for MSO indicates the post-treatment distribution of size classes has good representation in the 18- to 24-inch size classes in all habitats. Stocking in the 24-inch plus size class would have good representation in the restricted other habitat and would be

stakeholders development of the Old Growth Protection and Large Trees Retention Strategy (OGPLTRS) that the USFS 4FRI Team adapted into two documents: i) the Old Trees Implementation Plan (OTIP); and, ii) the Large Trees Implementation Plan (LTIP). The Old Trees Implementation Plan (LTIP) is discussed in the previous section Old Growth. The purpose of the stakeholders' large trees retention strategy is to emphasize the retention of large trees (VSS 4 and 5) in order to re-establish the old growth necessary for the ecological sustainability of eastern Arizona forests. However, the large trees retention strategy also includes a series of exception mechanisms that codify the socially acceptable removal of large trees (VSS 4 and 5) with a diameter superior to 16" at breast height (d.b.h.), when their removal is necessary to achieve the ecological restoration objective, to increase heterogeneity, and/or to conserve biodiversity. The stakeholders' document also includes provisions for collaborative adaptive management and collaborative participation to propose decision content, while complying with the statutory retention of the decision making authority by the Responsible Official. Apache County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) i) does not fully reflect the intent of the stakeholders; and, ii) does not take advantage of the products of the 4FRI collaboration. Specifically: 1.The Forest Service determined that: "The original LTRS did not provide the ability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings category" (DEIS p. 57). In so stating, the Forest Service apparently overlooks the fact that removal of individual large young trees is allowed under the exception mechanism, as required to meet the ecological restoration objective. The stakeholders' intent in constraining the removal of groups of large young trees is to allow the development of future old growth as required in the forest plans, including old growth groups. 2.The Forest Service further determined that: "this would result in a continued imbalance of size classes that would be contrary to the forest plan desired conditions" (DEIS p. 57). In so stating, the Forest Service fails to capitalize on the fact that the 4FRI DEIS already includes several forest plans underrepresented in the target/threshold habitat. The goshawk analysis indicates that mature and old forest structural stages that are currently underrepresented would trend toward improved representation in all habitats. Treatments within areas currently allocated old growth would maintain existing old growth structural attributes and would be managed to move toward those conditions over time. The ponderosa pine old growth analysis above indicates old growth structural attributes would continue to develop and improve across the landscape. The forest health discussion presents that the overall sustainability of the ponderosa pine forest would be improved across the landscape including the large/old tree component"□. In response to comments on the DEIS, the purpose and need in chapter 1 was edited to include more language on CFLRA requirements (a focus on smaller diameter trees) and a large tree desired condition section. The implementation plan (appendix D) was updated to add consistency checks to CFLRA. See the annual implementation checklist and NEPA, NFMA, ESA and CFLRA Act compliance evaluation tables. Additional design features were added to clarify when large, young trees would be cut. An example of the language can be found in the goshawk LOPFA WUI55, UEA 40, UEA 25 and UEA 10 section. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6. See our previous response regarding the large tree retention strategy and alternatives considered but eliminated that addressed diameter limitations as a means to conserve large trees.

White, Tom	amendments and that these amendments can address this issue as well. Further, the USFS 4FRI Team does not disclose at what scale the imbalance would occur. Imbalance at group level, or even possibly at stand level, becomes balance at larger scales as groups of VSS 5 future old growth balance large areas devoid of them. 3.The Forest Service also determined that: "The original LTRS would have required the Forest Service to consult with stakeholders should a new exception category be found during implementation (LTRS, page 25). To resolve the potential for Federal Advisory Committee Act (FACA) violations, this consultation requirement was removed" (DEIS p. 57). In so stating, the Forest Service misses an opportunity to take advantage of the MOU signed between the USFS and the stakeholders to address specifically such issues through collaboration in compliance with FACA. Therefore, Apache County is concerned that the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP) is likely to be a significant social license risk for the 4FRI DEIS, and that the risk / benefits analysis of the social license risk vs. the restoration benefits may be unfavorable to 4FRI. Consequently, Apache County is concerned that the social license risk for the 4FRI DEIS likely caused by the adaptation of the stakeholders-developed large trees retention strategy by the USFS 4FRI Team into the Large Trees Implementation Plan (LTIP), presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments. Apache County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1.Presenting at what scale the inability to create regeneration openings using a group selection treatment method within the large, young tree and the within stand openings categories would result in a continued imbalance of size classes; 2.Presenting a collaborative process that would allow the USFS Responsible Officials to comply with the FACA requirements while implementing stakeholders supported adaptive management in case a new exception category would be needed during implementation; and, 3.Presenting language for expanding the amendments plans, if actually necessary, should a multiple scale analysis not address the issue of continued imbalance of size classes.	(184-44) Please see previous responses.

White, Tom	Apache County observes that there are only a mere 5 instances of the word "prioritization" in the 744 page 4FRI DEIS. The County further observes that none of these instances apply to the discussion of the concept of treatments prioritization, for the obvious reason that there is no discussion of treatments prioritization in the 4FRI DEIS, including in Appendix D Alternative B through D Implementation Plan, or in the specialist reports or in the project record. Apache County also observes that Appendix D Alternative B through D Implementation Plan contains no discussion of timing or sequencing of treatments and that the concept of 'Implementation Plan' seems interpreted in the 4FRI DEIS as 'guidelines to implement' rather than 'action plan to implement' or 'work plan to implement.' The County certainly realizes that minute details of implementation are not a NEPA concern but a contracting management concern. However, the County also posits that the implementation of a management action as far reaching in scope and temporal and geographical scale as 4FRI, requires a discussion of timing and sequencing, inasmuch as timing and sequencing of treatments are of a nature to potentially impact significantly the site specific effects of individual treatments and the collective cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects). Further, the concept of 'Strategic Placement' of the treatments, in relation to values to be protected, dominant winds, modeled fire behaviors, etc., is critical in the determination of what treatments are most appropriate, how many treatments are required, what treatment intensities are required, and what is the best distribution between treatment types (mechanical vs. fire). The 4FRI stakeholders worked extensively to produce the Landscape Restoration Strategy for the First Analysis Area (2010) that addressed in detail the concept of geographical and temporal prioritization. This work was further refined with the participation of the USFS 4FRI Team into a classification of High Resource Values (HRVs) and Medium Resource Values (MRVs). Some elements of this work were utilized by the USFS 4FRI Team in the 4FRI analysis process, but the discussion of strategic placement; geographical and temporal prioritization; and, their	(184-45) Recommendations that included sequencing were categorized as outside the scope of this analysis. The disclosure of sequencing within a NEPA document would be problematic because it would bind the Agency to a fixed schedule that may be unattainable due to weather, fires, markets, or other unforeseen circumstances. It would likely result in inaccurate assumptions being used to analyze the environmental consequences for all resources. Although the FEIS does not address implementation sequencing, the operations component of 4FRI will continue working with stakeholders in the spirit of implementing the requirements of the CFLR Act. A 10-year operational plan will be developed. This recommendation is most appropriately addressed in implementation and operations. Recommendations that included strategic placement of treatments were categorized as being outside the scope of the analysis and not in alignment with the purpose and need for the project. Treating only strategic locations is a strategy used for hazardous fuels treatments when the primary objective is to modify fire behavior and to reduce high severity fire effects. In ponderosa pine, there is an overlap between hazardous fuel treatments and restoration treatments because restoring ponderosa pine forests generally results in reducing the severity of potential fire effects. Fuel treatments can include such strategies as thinning from below or leaving a minimum distance between tree crowns or boles. Neither of these would put a ponderosa pine forest on a trajectory towards health and resilience. The treatments displayed in the DEIS (alternative C, preferred alternative) and FEIS are designed to put the landscape on a trajectory towards the desired condition by treating the entire landscape, not just "strategically" placed treatments. Additionally, on a landscape the size of the 4FRI, it would be a gamble to guess where a fire might start, and the variables would be too numerous to make such an assessment valid.

impact on: number, type, intensity, individual and cumulated effects of treatments, is missing. Apache County is not inferring the need to re-analyze the location of the treatments. The County is generally satisfied with the map of treatments location. However, because the timely implementation of the restoration treatments is critical to meeting the purpose and needs of the proposed action, the County is concerned that the spatial and temporal sequencing of the treatments may have a significant effect on: i) whether the purpose and needs will be met; and, ii) the number, type, intensity, and individual and cumulated effects of the treatments required to meet the purpose and needs. Therefore, the absence in the 4FRI DEIS of spatial and temporal strategic timing and sequencing of the treatments, and integration of the influence of spatial and temporal prioritization of the treatments on the number, type, intensity, and individual and cumulated effects of treatments, may present a process risk for the 4FRI EIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a discussion of strategic placement, spatial and temporal prioritization, and their influence on the number, type, intensity, and individual and cumulated effects of treatments, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Apache County respectfully suggests that the USFS 4FRI Team provide a clear and compelling analysis: 1.Presenting a temporal prioritization of the treatments and a sequenced timeline of implementation for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; 2.Presenting a spatial prioritization of the treatments and the sequenced locations of the treatments, for the treatment of 30,000 acres annually over the 10 year life of the 4FRI project; and, 3.Presenting how the temporal and spatial prioritization affect the number of treatments, type of treatments, intensity of treatments, direct, indirect, site specific, and cumulated effects of the treatments.

White, Tom

Fire behavior modeling is a critical part of the 4FRI site specific and cumulative analysis process, and Apache County appreciates the fact that a major effort was made along the entire 4FRI analysis process,

White, Tom

(184-46) See previous responses. We recommend the counties continue to work with the forests and the monitoring and adaptive management group during implementation.

(184-47) Page 15 to page 25 of the fire ecology report prepared for the DEIS outlines methodology and modeling used to support the fire analysis. For example, the fire report states, “Fire behavior for existing

starting well before the DEIS, or even the Proposed Action, to model the cumulative effects of landscape scale restoration treatments on fire behavior. To the County, post-treatments and long term future desired conditions fire behaviors represent much of the 'end game' in 4FRI, as the restoration of a natural regime of regular cool surface fires is fundamental to the long term ecological sustainability of the forests of eastern Arizona. Probably as a consequence of the fact that the 4FRI DEIS does not include a specific treatments implementation plan including timing, prioritization and sequencing of treatments in Appendix D Alternative B through D Implementation Plan (see section Prioritization here above), the fire behavior modeling in the 4FRI DEIS only provides a theoretical modeling based on the unrealistic premise that all treatments would happen simultaneously. This is unfortunate because the fire behavior modeling cannot include accurate canopy characteristics (base height, bulk density and cover) or surface fuel loading for any given large area at any given point in time as a result of some treatments being implemented; some treatments not being implemented yet, with fuel load further increasing and canopy characteristics further degrading; and, some treatments having been implemented, possibly as earlier as a decade earlier, with canopy and fuel loading characteristics at various stages of regrowth. Accordingly, Apache County is concerned that post-treatment fire behavior as modeled may not represent reality, and that the analysis of the cumulated effects of the treatments (understood as the effects of the cumulated treatments within 4FRI, as opposed to the NEPA understanding of cumulative effect of the 4FRI treatments plus other projects) may be tainted. Therefore, Apache County is concerned that the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, due to the lack of timing and sequencing of the treatments, may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the modeling of the fire behavior effects of the treatments based on the assumption that all treatments are performed simultaneously, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed

conditions was modeled for the project area using default Landfire Refresh 08 data. Results were reviewed by local fire experts (district, forest, National Park Service and non-federal firefighters and managers), and adjustments made to improve model accuracy. The process was repeated to further improve results. Fire behavior for post-treatment conditions was modeled using FlamMap and a combination of Landfire Refresh 2008 data and FVS-FFE data (LANDFIRE 2010a, LANDFIRE2010b). Post-treatment canopy characteristics and fuel loading were determined using the Fire and Fuels Extension (FFE) (Reinhardt and Crookston 2003) to the Forest Vegetation Simulator, FVS (Dixon 2002). In fire modeling, outputs (such as fire type and fireline intensity) are determined, in part, by the fuel models used. Post treatment fuel models need to take into account changes in total fuel loading and fuel structure. Landfire data must be manipulated to produce post-treatment conditions for fire modeling, so outputs from FFE were used to develop post-treatment fuel models. The modeled post-treatment fire behavior data are the result of combined stand data from the Forest Vegetation Simulator (FVS) and Landfire Refresh 2008 data. Post-treatment fire type was modeled by using outputs from FVS-FFE to adjust the percent of change to canopy characteristics and surface fuel loading and to inform the assignation of post-treatment fuel models. Details of the process for assigning post-treatment fuel models for modeling fire type is included in Appendix D. FVS outputs used were stand averages that were used to give a general idea of what stand conditions would look like, but could not address the spatial distribution of specific metrics on the same scale as the Landfire data. Landfire/FlamMap data are gridded (raster) data, with a resolution of 30 meters. FVS/FFE data is vector based, with smallest units being the size of individual stands. The 'hills and valleys' of the stand characteristics were smoothed out when the stand data were averaged, resulting in the fire behavior also being 'smoothed out' somewhat. A stand is 'typed' as a single vegetation type, though it may have a mix, for example, of pine forest and grassy openings. Habitat types (e.g. core areas, restricted habitat, etc.) were classified at the stand level to facilitate silvicultural analysis. Fire behavior was modeled at the 30 meter scale. The resolution for modeled fire behavior is 30 meters". The cumulative effects analysis for all alternatives is located on pages 227 to

	in its plans and policies and in these comments.	249. Pages 18-23 of the fire ecology report specifically discuss methodology for evaluating canopy characteristics and fuel loading. Pages 23 to 25 display data sources and models. Appendix D of the fire ecology report (pp. 283-321) is titled, "Descriptions of models and processes used in fire modeling". Appendix D not only includes information on how the model was used but also discusses limitations associated with specific models.
White, Tom	Apache County respectfully suggests that subsequent to the completion of an analysis presenting a temporal and spatial prioritization of the treatments, the USFS 4FRI Team provide a clear and compelling analysis of the effects of the treatments on fire behavior, presenting annual or bi-annual fire behavior modeling based on the outcome of the progressive implementation of 30,000 acres of restoration treatments annually over the 10 year life of the 4FRI project, and that the impact of this analysis be integrated in the analysis of the number, type and intensity of treatments required to meet the purpose and needs, and the direct, indirect, site specific, and cumulated effects of the treatments.	(184-48) Please see previous responses concerning prioritization and fire modeling. In summary, It is not feasible to segment the NEPA analysis based on arbitrary prioritization assumptions that may or may not occur.
White, Tom	The ponderosa pine vegetation type in the 4FRI DEIS analysis area is dominated by Class 2 functional at-risk 6th level Hydrologic Unit Code (HUC) watersheds on about 451,500 acres or 46 % of the analysis area. Class 3 impaired watersheds represent about 316,800 acres, or about 32 % of the analysis area. Class 1 properly functioning watersheds represent about 220,400 acres, or about 22 % of the analysis area (DEIS p. 107). Per the Specialist report, and as summarized in the 4FRI DEIS, the 4FRI restoration treatments under Alternative B (the Proposed Action) and Alternative C (the Preferred Alternative) are expected to result in an improvement in 23% of Class 2 functioning at-risk watersheds (~104,000 acres), and 42% of Class 3 impaired watersheds (~133,000 acres), with 28 miles of improved water flow regimes overall, including 19 miles in Class 2 watersheds that are functioning at risk and 9 miles in Class 3 watersheds currently impaired (DEIS p. 114). Apache County is generally satisfied that the effects of the 4FRI restoration treatments under Alternative B and Alternative C contribute significantly toward the County's objectives as expressed in its plans and policies and in these comments.	(184-49) Thank you for your comment.

White, Tom	Apache County encourages the USFS 4FRI Team to prioritize wherever and whenever possible restoration and catastrophic fire prevention treatments in the watersheds, after the direct protection of communities and infrastructures.	(184-50) See our previous response. Treatments in at-risk watersheds are a high priority.
White, Tom	During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Apache County observed that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Additionally, the site specificity verification process revealed that some of the required Geographic Information System (GIS) data tables or layers were not entered into the official project record. Therefore, Apache County is concerned that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data and may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the integrity or completeness of the official project record as required under NEPA may be compromised by the accidental omission of technical data, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(184-51) During this process (from scoping to DEIS to FEIS), no one has asked for the complete project record, including ECO. Throughout this entire process, we have openly shared our GIS data. It appears to have been usable to those with geospatial technology skills for a particular resource such as wildlife, silviculture and fire. We believe the project record, including all supporting data, has been included. We would welcome you pointing out to us what supporting data or information is missing in our project record.
White, Tom	Apache County respectfully suggests that the USFS 4FRI Team conduct a systemic and systematic review of all technical data, GIS or other, used in their analysis, and ensures that it is included in the 4FRI project record. The County further suggests that the USFS 4FRI Team use the same methodology of random sampling as used by the DEIS Review Workgroup of the 4FRI Stakeholders Group to statistically verify that all required data is included in the project record.	(184-52) Please see the response to #184-51.
White, Tom	During the participation of the Eastern Arizona Counties Organization in the DEIS Review Workgroup of the 4FRI Stakeholders Group, and the associated work with the USFS 4FRI Team, Apache County verified to its satisfaction that the required site specificity as regards current condition, desired future condition, prescribed	(184-53) Regarding site specificity, the DEIS displays up to 20 specific silvicultural and prescribed fire treatments for each alternative (DEIS, pages 71-72, 83-84 and 90-91). At least 20 treatments were applied to ~30,000 stands based on site specific characteristics (VSS class, species, single story/multi-story structure, etc.) the result was well over 1,000

treatment, and site specific effects has been provided in the USFS 4FRI Team analysis process. However, as stated in the above section Continuity between the USFS 4FRI Team work, the 4FRI project record, and the 4FRI DEIS, the site specificity verification process with the USFS 4FRI Team evidenced to both the County and the USFS 4FRI Team that site specific information can be virtually impossible to access by anyone not deeply immersed with or, for all practical purposes, not a member of the USFS 4FRI Team. Therefore, Apache County is concerned that the difficulty to access site specificity information may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the difficulty to access site specificity information, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

different outcomes. Table 18 (DEIS, page 74) displays road activities by restoration unit and table 19 (DEIS, page 74) displays miles and/or acres of springs, ephemeral channels and aspen treatments by restoration unit. Figures 27 and 28 in the DEIS display the locations for road, springs and stream treatments (DEIS, pages 75-76). Examples of site-specific analysis are located in chapter 3 of the DEIS (page 105 to page 322) where site-specific effects for each resource are disclosed. For wildlife and overstory tree metrics, the stand (location/site) is the site specific unit that was used to aggregate data up to the individual metrics displayed within the DEIS. For soil and water, the base unit is the terrestrial ecosystem map unit that aggregates up by stand, by treatment type and intensity. For recreation/scenery, the basic units are the respective recreation opportunity class (ROS) and scenery management classes (SMS) that aggregate up. For economics, the timber volumes are aggregated up from location/sites. For range, the basic unit is the range allotment. For transportation, the basic units are the individual road segments. For botany and rare plants, the basic units tie to select Terrestrial Ecosystem Units where the plants are likely to occur as well as previous survey data for both rare plants and noxious weeds. For fire ecology, the base unit is 30 meter pixels from land fire data that are aggregated up. The Implementation Plan (DEIS, appendix D, page 601) states, "The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Tables 112 to 115 are checklists designed to ensure compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is the foundation for the formal silvicultural prescriptions. The silvicultural

prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions" (DEIS, page 601). The narrative for table 114 states, "The checklist is designed to ensure resource surveys are completed as required by the forest plan, policy, U.S. Fish and Wildlife Service (FWS) biological opinion, Comprehensive Forest Landscape Restoration Act (CFLR), or other requirements. The checklist also ensures that the site-specific treatments are compliant with the NEPA analysis and decision. The checklist is designed to be used by the resource specialists who comprise the implementation team and by the Agency's (delegated) approving official" (DEIS, page 601). The site-specificity of the analysis was tested by the 4FRI stakeholder group. In response to comments on the DEIS, the stakeholder's wrote, "The Stakeholder Group is concerned that in such a large analysis area, the DEIS might not be detailed enough to disclose site specific impacts of the proposed treatments. To test this concern, three randomly-selected sites were presented to the USFS DEIS development team. For these three stands, we asked to see the data that describes the existing condition, desired condition, proposed treatment, the effects of this treatment on the various resources, and how these effects are considered in the cumulative effects analysis. It took several hours to find all of the requested information for the three sites, but it does appear that extensive site specific analysis went into the DEIS document and we are satisfied that site-specificity is not an issue (4FRI Stakeholder, 2013 Cara Letter #155). See our previous responses which address the inclusiveness of project record documentation.

White, Tom	As discussed by the Eastern Arizona Counties Organization with the USFS 4FRI Team, Apache County respectfully suggests that the interactive map presented on the 4FRI DEIS website be developed to allow easy 'point and click' access to site specific information such as, but not limited to, current condition, desired future condition, prescribed treatment, site specific direct and indirect effects, and contribution to cumulative effects, as well as all the technical information regarding all relevant resources as can be conveniently provided. Alternatively, if technical or resource constraints preclude the USFS 4FRI Team to develop the above suggested interactive map,	(184-54) The interactive map is designed to provide people with an alternative method of reviewing maps and alternatives than the traditional poster-sized hard copy. People may still review the project record index and request documents (if not considered to be sensitive information, such has heritage site locations).

	or to make it available to the public, Apache County respectfully suggests that a 'point and click' function could provide information on how to procure the desired site specific data from the project record.	
White, Tom	Appendix F Cumulative Effects includes a comprehensive list of the past, current and reasonably foreseeable future projects and disturbances included in the cumulative analysis. These projects and disturbances include vegetation projects (mechanical thinning and prescribed fires); recreation projects; other projects; wildfires; insect and disease outbreaks; and, a short discussion of reasonably foreseeable projects with insufficient information for analysis. The list includes projects located on private, State, national forests and other federally managed lands that lie within, adjacent to and outside of the project area. Appendix F Cumulative Effects does not include a discussion of what the cumulative effects of all the projects are, and only includes a brief synopsis of Authorized Livestock Management; Timber Harvest; and, Post-1996 Vegetation Treatments - Uneven-aged Management, Fire Risk, Restoration, summarized from the Specialists' reports.	(184-55) Thank you for your comment. For past actions, the cumulative effects analysis must be consistent with 36 CFR 220.4(f). This regulation incorporates direction from 40 CFR 1508.7 and The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005). FSH 1909.15.3 provides specific direction on determining the spatial and temporal boundaries, two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial boundaries define the affected area for each resource indicator. Affected areas can vary in size by resource and by the type of effect that may occur. We expect the cumulative effects analysis to be different for each resource. “For example, the affected area for soils in a timber thinning operation would typically be the harvest units where soils are directly disturbed. However, the affected area for elk habitat may be an elk management unit that takes in several watersheds. Because affected areas are resource dependent, they generally have boundaries that are physical or biological rather than political" (FSH 1909.15.2a). As long as the specialist has defined the affected spatial area, the temporal boundaries, documented the rationale and sources for the spatial and temporal boundaries, and described the effects that overlap in time and space for past, present and reasonably foreseeable actions, they may present their analysis as they choose. Regarding the content of the cumulative effects analysis, please see our response to comment #184-61.
White, Tom	Chapter 3 Affected Environment and Environmental Consequences addresses extensively the concept of cumulative effects on Soils and Watershed; Vegetation; Fire Ecology; Air Quality; Terrestrial and Semiaquatic Wildlife and Plants; Aquatics; Noxious and Invasive Weeds; Heritage Resources; Tribal Relations; Socioeconomics; Recreation; Lands and Minerals; Scenery; Range; and, Transportation. However, the format used to discuss the cumulative effects varies considerably from resource to resource. For example, the Soils and Watershed (DEIS p.105-121) and the Terrestrial and	(184-56) In response to comments on the DEIS and changes that have occurred since the DEIS was published (see chapter 2) all cumulative effects analyses have been updated in the FEIS and specialists' report to include projects that are reasonably foreseeable, including the FWPP and other natural disturbances (such as the 2014 Slide Fire on the Coconino NF). Clarifying language has been added to the "Cumulative Effects Appendix F" in the FEIS to reduce the potential for confusion. The intent of the appendix F in the DEIS was to document past and/or historic events and actions that had resulted in the existing/current

Semiaquatic Wildlife and Plants (DEIS p.173-245) sections include fairly comprehensive descriptions of the cumulative effects and of their rationale. Other sections formulate cumulative effects as opinions, or as summary statements that essentially posit that the past or current projects have achieved or are achieving their stated objectives.

condition. The intent was to display those actions and events that had the ability to affect vegetation structure, pattern, composition and disturbance regimes. The intent was not to replace the site-specific cumulative effects analysis that each resource conducts. In the DEIS, the Mexican spotted owl cumulative effects analysis was located on pages 187-189 of the DEIS. The analysis references appendix 12 of the wildlife report where there is an extensive list of projects with notes on the type, size, and objective of each project. Baseline conditions were defined in the text. Table 196 of the wildlife report (page 705) described past projects conducted by the FS and identified the projects by National Forest and Ranger District. Table 197 of the wildlife report (page 719) listed similar information for past projects conducted by other agencies or private land managers. Table 198 (page 720) listed past wildfires to help inform baseline conditions. Table 199 of the wildlife report (page 723) described current and ongoing projects by the FS and identified each project by National Forest and Ranger District. Table 200 (wildlife report) described reasonably foreseeable projects (pp. 734-739). Reasonably foreseeable means that intent and acreage might be known, but until a record of decision is signed, change could occur in the type of treatments proposed, the size of treatments, and the location of treatments. All of these projects (i.e., wildlife report, pp. 705 - 739) were summarized in terms of MSO habitat. An introductory paragraph and seven summary tables followed (wildlife report, pp. 740 - 745). The cumulative effects analysis for past and ongoing projects related to the MSO was divided into effects to forest structure and effects to prey habitat, in line with the project analysis (wildlife report, pp. 319 - 321). The type of action, associated acres, and effects to MSO were discussed. Because there is no certainty as to what might happen, when it will occur, or how large the project will be, reasonably foreseeable actions were addressed separately (page 321).The above actions were summarized on page 187-189 of the DEIS. How these effects relate cumulatively to the 4FRI project was discussed by alternative on pages 188-189 of the DEIS. However, based on comments on the DEIS and changes between DEIS and FEIS (see the wildlife report for changes that were specific to wildlife), the cumulative effects analysis for MSO was revised. The FEIS wildlife report states "Because of the size of the 4FRI analysis area and the large portion of the western

White, Tom	The Cumulative Effects section itself of Chapter 3 is but a two sentence paragraph that states: "A summary of past, present, and reasonably foreseeable management actions and natural disturbances that were evaluated by most resources is located in	UGM Recovery Unit that it occupies, the analysis area itself was considered adequate for assessing habitat effects to PACs. However, due to the potential for disturbance to owls, the cumulative effects boundary was extended ½ mile beyond the analysis area periphery to account for the spatial component of this analysis...The temporal component in this analysis was defined as 10 years for short-term effects and 30 years for long-term effects" (Wildlife Report, page 400). Projects before 1996 are incorporated into existing conditions. Aspects of existing conditions that are a result of these early projects include a deficit in large trees and snags and even-aged conditions. Pre-1996 projects also had heavy selection pressure for preferred tree genetics to provide healthy trees with good form. This latter effect resulted from harvested areas being regenerated from planting stock or from the selected reserve trees left in seed tree harvest units (Higgins, pers. comm. 2006). Wildlife habitat in the form of nesting, feeding, and loafing sites was reduced by selecting for disease-free trees with symmetric shapes, eliminating fork-top trees, trees with unusual branching patterns, and replanting with selected genetic stock from nurseries. Current and foreseeable projects within the 4FRI boundary have or will thin a total of 39,111 acres of MSO habitat and use prescribed fire on 37, 585 acres. This is mostly (84 percent) due to work conducted in restricted habitat (Wildlife Report, table, 153). Most work done in MSO habitat involves mechanical thinning or prescribed fire. Thinning and burning in MSO habitat would follow forest plan/Recovery Plan guidance with rare exceptions such as powerline right of ways. Other projects also include slash disposal, invasive weed treatments, and limited acres of animal damage control, erosion control, and disease tree harvest (Wildlife Report, Appendix 17). Effects to MSO habitat are broken down into two broad categories: Forest structure and prey habitat. The FEIS cumulative effects analysis for MSO is located on page 400 to page 412 of the wildlife report. Similar to MSO, the goshawk cumulative effects analysis has been revised since the DEIS was published, see the FEIS, chapter 3. (184-57) Chapter 2 of the FEIS notes that 4FRI treatment acres overlapping with the Flagstaff Watershed Protection Project have been removed from the 4FRI FEIS analysis. See our response to comment 76-62 and 76-63 for a general discussion on cumulative effects.

	appendix F. See the project record for the comprehensive master list of all projects and for additional information on each project" (DEIS p. 331). Apache County is generally satisfied that the list of projects considered in the cumulative effect analysis is appropriate, with one notable exception. Since the completion of the 4FRI DEIS, the Flagstaff Watershed Protection Project Proposed Action (PA) has been released (April 2013) and will need to be integrated into the cumulative analysis in the final EIS. Apache County is generally satisfied that the resource specialists have conducted some form of cumulative effects analysis, and the County realizes that the cumulative effect analysis methodology cannot be identical across resources. However, the County is concerned that the methodologies for cumulative effects analysis are generally not satisfactorily explained, and may be inconsistent in depth and breadth across resources. The County is further concerned that the issue of continuity between the project record, the specialists reports, and the DEIS - already identified regarding site specific effects -may also exist regarding cumulative effects. Therefore, Apache County is concerned that potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by potential inconsistencies across resources in the depth, breadth and presentation of the methodologies used for cumulative effects analysis, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and	
White, Tom	in these comments. Apache County respectfully suggests that the USFS 4FRI Team include the Flagstaff Watershed Protection Project Proposed Action (April 2013) in the cumulative analysis in the final EIS. Apache County further respectfully suggests that each resource section of Chapter 3 Affected Environment and Environmental Consequences include a methodology subsection describing the methodology used for cumulative effects analysis. The County also suggests that the USFS 4FRI Team review methodologies across resources to ensure	(184-58) Please see previous responses.
White, Tom	consistency of depth and breadth of cumulative effects analysis.	(184-59) Thank you for your recommendation.

White, Tom	Appendix E Alternative B through D Monitoring and Adaptive Management Plan offers brief one or two sentence descriptions of: types of monitoring (ecological, implementation, effectiveness, validation and Collaborative Forest Landscape Restoration Act (CFLRA)); monitoring prioritization, scales, question and indicators; and, a ten line description of adaptive management. Appendix E also includes Table 143 Implementation monitoring questions, indicators, frequency of measurement, data source, and cost; Table 144 Landscape-scale effectiveness desired conditions, indicators, frequency of measurement, data source, and cost; and, Table 145 Effectiveness monitoring plan. However, Apache County observes that about half of Table 143 Implementation Monitoring is left blank, and for most questions for which the table is not blank, the indicators are crude and the frequency is minimal (typically: annual acres and miles). Table 143 looks more like an annual budgetary reporting table than a project implementation monitoring plan. The quantitative aspect of implementation monitoring seems addressed but the qualitative aspect of implementation monitoring seems largely unaddressed or unanswered. It is surprising that half the table is incomplete, indicating an unfinished product. Apache County also observes that Table 142 Monitoring scales, is left incomplete inasmuch as it does not include any monitoring scale below the sub-unit for the 4FRI DEIS. This, too, indicates an unfinished product. Further, there appears to be a gap in the effectiveness monitoring plan inasmuch as most of the treatments focus on achieving treatments objectives and desired conditions at the stand or even group level, while most of the effectiveness monitoring appears to be planned at the landscape scale. Apache County further observes that Table 144 Landscape-scale Effectiveness offers a fairly comprehensive list of desired future conditions: Conservation of Biological Diversity; Ecosystem Resilience; Water and Air Resources; Economics; Social Systems; and, Heritage Resources. However, the indicators listed are macro level indicators and the frequency of measurement is generally annually or every 5 years, and many sections of the table in the "Data Source/Spatial Scale/Cost" column indicate "No numbers provided." This further indicates an unfinished product.	(184-60) At the time the DEIS was released, formal consultation with FWS (which resulted in a biological opinion) had not been initiated. The FWS signed the biological opinion (AESO/SE 22140-2011-F-014) for the project on October 20, 2014. Since the DEIS was published, the Forest Service worked with stakeholders and finalized the Adaptive Management, Biophysical and Socioeconomic Monitoring Plan (appendix E); and, a multi-party monitoring board was created to manage and guide monitoring through project implementation. Appendix E of the FEIS includes goshawk monitoring. A monitoring protocol for MSO was developed by the FWS in collaboration with the Forest Service during the formal consultation process. The protocol includes monitoring breeding pair occupancy reproductive output, and key habitat components across multiple pairs of treatment and reference PACs and also across different treatment types. The data that results from implementing this monitoring protocol will help provide important information about the effects of restoration treatments on MSO and will be used to inform adaptive management. A description of these protocols is included in appendix E. Conducting range-wide monitoring for MSO was considered beyond the scope of this project. Population monitoring at a biologically meaningful scale requires large landscapes that include multiple states and jurisdictions. An undertaking of this scale has been initiated by the USFS Southwestern Regional Office in cooperation with the Rocky Mountain Bird Observatory. In addition to MSO monitoring, appendix E now incorporates monitoring for Arizona bugbane. County comments imply the need for a supplemental EIS because the monitoring plan was not complete. In response to comments on the DEIS an agency may: (1) Modify alternatives including the proposed action, (2) Develop and evaluate alternatives not previously given serious consideration by the agency, (3) Supplement, improve, or modify its analyses, (4) Make factual corrections. Items 3 and 4 directly apply to the monitoring plan. As a result of comments on the DEIS, the following changes were made to the monitoring plan: (1) Expanded introduction section to provide additional context for: the purpose of the monitoring and adaptive management plan, the restoration framework under which it was developed, and the role of the monitoring and adaptive management plan in the broader 4FRI area; (2) Expanded the Adaptive Management

		section to: provide details on the purpose of adaptive management, provide a description of the adaptive management process (including a flow chart), provide information on where adaptive actions fit into the process, and, change the section name to "Adaptive Management Process"; (3) Added a section on the "Requirements for Monitoring" to: provide the legislative background for CFLRP and its monitoring requirements and provide the legislative background for stewardship contracting and its monitoring requirements; (4) Modified the "Types of Monitoring" section to: reflect information that was moved to other sections and expand the definitions of terms; (5) Modified the "Monitoring Questions and Indicators" section to: reflect changes in how the plan questions and indicators are organized and change section name to "Monitoring: Desired Conditions, Indicators, Thresholds and Triggers", (6) Modified the "Monitoring Prioritization" section to reflect a more detailed prioritization scheme, provide clearer definitions of each priority level and changed section name to "Prioritization - Monitoring Tiers"; and (7) Modified the "Monitoring Scale" section to add table column and text to provide a clearer explanation of how scale is interpreted and how it related to the Desired Conditions and indicators in the monitoring plan, and reorganized scale categories for ease of interpretation. The DEIS (appendix B) informed people that the monitoring plan for Mexican spotted owl would result from the FWS biological opinion. The DEIS version of the monitoring plan (appendix E) did not preclude the wildlife analysis or effects determination for northern goshawk, a Forest Service sensitive species (DEIS, chapter 3, "Forest Service Sensitive Species" section). The monitoring plan did not preclude a complete and thorough silvicultural analysis (DEIS, chapter 3, "Vegetation" section) and the development of the implementation plan (appendix D).
White, Tom	Apache County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more of an adaptive management decision matrix than an effectiveness monitoring plan. Adaptive management is addressed in the following section Adaptive Management.	(184-61) Thank you for your comment. Please see our response to #184-60 which provides a summary of all updates to the plan between DEIS and FEIS.
White, Tom	Apache County is concerned that the 4FRI DEIS, the Specialists reports and the project record do not include a specific 'action plan' or 'work plan' and budget, or funding mechanisms, for the	(184-62) Thank you for your comment. A project work plan is developed each year once the Agency receives its budget as appropriated by Congress. Once the annual budget is available, the Forest Service will

	monitoring plan. Although the question of who will monitor, and potential funding sources, are nominally mentioned in Table 141 Monitoring plan tiers, the scale, scope and complexity of 4FRI require addressing these questions in a comprehensive fashion that goes well beyond a passing mention in Table 141. How many man-hours will the implementation of the monitoring plan require? Who will provide these man-hours? How much will it cost? How will it be funded? What are the quality control mechanisms to ensure that monitoring itself - if provided by volunteer (amateur?) third parties - meets required criteria? What mechanisms exist to ensure the integrity of the measures? Further, the reliance on "stakeholders" and "multiparty (monitoring boards)" in the 4FRI DEIS monitoring plan tiers (Table 141, DEIS p. 660) raises questions which are left unanswered regarding the functioning of the monitoring plan. For example: What is the USFS mechanism to utilize third party developed monitoring data to make agency action adaptive management decisions? What are the mechanisms to deal with adaptive management decisions that may be of a nature to significantly alter the management actions identified in the Record of Decision? Etc.	work with the Multi-Party Monitoring Board to prioritize monitoring activities. All of these questions will be answered in collaboration with the Multi-Party Monitoring Board as set forth in the collaboratively developed AMMP. These determinations cannot be made until we know more about the available annual budget, the funds that can be leveraged by partners, and the specific monitoring protocols developed by the Forest Service and the monitoring board. The Forest Service will continue to consider new peer-reviewed science as it becomes available. The collection of monitoring data through a third party would be coordinated by the multi-party monitoring board in collaboration with the Forest Service. Once the data is delivered, it will be verified and evaluated through by an interdisciplinary team of resource specialists. The results of the evaluation and the implications of potential adaptive management actions will be provided to the deciding official for a final decision. If monitoring indicates that the environmental effects of each action do not exceed the bounds of those disclosed in the environmental document, and the actions serve to move the project towards the desired conditions, the Forest service can continue implementation as described without the need for new or supplemental NEPA review (FSH 1909.15, 54.1). However, if monitoring indicates that the project is not moving towards the desired condition, the Forest Service will first evaluate design adjustments within the bounds of the management actions already disclosed and analyzed in the environmental document. For example, if the Forest Service were modifying the vegetation within an area according to treatment type UEA25, we may reduce the area occupied by interspace to 25 percent; rather than the maximum allowable of 40 percent. In both cases, the treatment type is the same, but the design change may better move the projects towards the desired condition. "In the case that new information or changed circumstances result in environmental impacts of a proposed action not disclosed or analyzed, further interdisciplinary review should occur as described in section 18"□ (FSH 1909.15, 54.1). (184-63) Thank you for your comments; they have been noted. See previous responses on budget and responses on the completeness of the information provided to the public in the DEIS on monitoring. The monitoring and adaptive management plan was developed in
White, Tom	Apache County is further concerned that the ability of the public to review and comment on the 4FRI monitoring 'action plan' or 'work plan' and budget has been compromised inasmuch as even if the USFS 4FRI Team develops such a plan and budget as an outcome of the comments process, the plan will not be available for public	collaboration with stakeholders. Enough information was provided in

	review and comments until a notice of decision is published, unless the USFS 4FRI Team decides to release a second 4FRI Draft EIS (DEIS) or a Supplemental EIS (SEIS). Considering that the 4FRI monitoring 'action plan' or 'work plan' and budget currently do not exist, it is not possible to submit substantive comments on them and, therefore, a potential objection could be ineligible based on 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments.	the DEIS (DEIS Appendix E) to inform the public. Sufficient information was included because many comments were received on the plan, including the need to incorporate the MSO monitoring plan. That document was unavailable at the time the DEIS was released for public comment because it was derived from the FWS biological opinion. However, 36 CFR 218.8 does address new information that was provided to the public after a comment period has been provided, "(c) Issues raised in objections must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector, unless the issue is based on new information that arose after the opportunities for comment". While there have been updates to the analysis since the DEIS was made available for public comment, the changes from DEIS to FEIS are insignificant or in response to public comments on the DEIS (allowed by CEQ). There is no need for a supplemental DEIS.
White, Tom	In contrast, the current Forest Service Manual requirements for Plan Monitoring Program Design (Sec. 1921.51) are extremely specific: "In designing the plan monitoring program, the Responsible Official: 1.Should consider ongoing project and activity monitoring. 2.Should establish and apply a screening process (FSH 1909.12, section 12.1) to ensure that only feasible and meaningful monitoring activities are conducted, and in a manner that is practical and affordable. 3.Should store and manage monitoring data in corporate applications such as Natural Resource Information System whenever the capability exists. 4.Should develop a multi-year monitoring guide that describes protocols, databases, and a monitoring schedule. 5.Shall develop an annual monitoring action or work plan to identify the specific monitoring tasks to be accomplished and the budget and personnel associated with those tasks." Apache County fully understands that Sec. 1921.51 was initially written to apply at Forest Plan level, and that the 4FRI DEIS is nested at project level within the Coconino and Kaibab forest plans. However, CEQ has made very clear that when mitigation is involved in the NEPA analysis - such as the adaptive management mechanism integrated within the 4FRI DEIS - monitoring is automatically invoked. Therefore, Apache County is concerned that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and	(184-64) As you state, the Plan Monitoring Program Design referenced in this comment applies to Land Management Planning (i.e. Forest Plans) and not to project monitoring. Furthermore, "CEQ recognizes that it may not be possible to identify fund from future budgets; however, a commitment to seek funding is considered essential and if it is reasonably foreseeable that fund for implementation of mitigations may be unavailable at any time during the life of the project, the agency should disclose in the EA or EIS the possible lack of funding and assess the resultant environmental effects"□ (CEQ memorandum 2011). The Forest Service commits to using a portion of its annual funding for monitoring and both the Forest Service and the 4FRI stakeholder groups have committed to seeking additional funds. The updated AMMP clearly states that "budget limitations dictate how much and what type of monitoring can be accomplished. In order to prioritize what monitoring will be accomplished, this plan provides a tiered system for prioritizing monitoring" (DEIS Appendix E). CEQ guidance also provides that "agencies have discretion, within the scope of their authority, to select an appropriate form and method for monitoring" and "possible monitoring methods include agency-specific environmental monitoring, compliance assessment, auditing systems" (CEQ memorandum 2011). The AMMP was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will

with subsections 4) and 5) in particular; that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised; and, therefore, the 4FRI Monitoring Plan may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the fact that the 4FRI Monitoring Plan may fail to comply with the requirements of Forest Service Manual Sec. 1921.51 in general, and with subsections 4) and 5) in particular, and that the ability of the public to review and comment on the 4FRI monitoring action or work plan may have been compromised, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.

Apache County respectfully suggests that the USFS 4FRI Team include in very specific terms: i) quantitative, qualitative and effectiveness monitoring processes; ii) a monitoring 'action plan' or 'work plan' and budget; and, iii) the resources allocation and funding necessary to implement monitoring in the 4FRI DEIS, to ensure that the monitoring of the 4FRI project implementation is quantifiably and qualitatively implemented. Practically, Apache County suggests a three step monitoring process articulated as follows: 1)Quantitative implementation compliance monitoring. The purpose of the quantitative implementation compliance monitoring is to answer the question: "Was the job done?" While, generally, this assessment is made by the Forest Service contract management team when a contractor is involved, it is suggested that this step becomes the beginning of the process rather than what is often the end of it. Specific quantitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 2)Qualitative implementation compliance

White, Tom

have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively working with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Interested parties may scrutinize the updated monitoring plan and continue to comment. This may occur during the objection period which is designed to allow discussions between the FS and interested parties to explore any changes to the proposed actions. This discussion occurs before the Record of Decision is signed that authorizes project implementation. (184-65) The DEIS identifies design features and mitigation by resource that would apply to any of the action alternatives (DEIS, Appendix C, Table 111, and page 565 to page 599). Appendix D of the DEIS states, "This implementation plan is designed tube integral to the selected alternative and record of decision (ROD). The process described in this appendix describes the linkage from the EIS to the project specific work without the need for additional NEPA analysis. It must be considered in conjunction with appendix C that provides the design criteria, best management practices, and mitigation measures. Table 112 to table 115 is checklists designed to monitor compliance with the analysis, decision, and other requirements. Essentially, if the quantity of treatments in table 112 and table 113 by resource unit are within the bounds of the treatments analyzed in chapter 3 of the EIS and the specialist's reports, then the program of work is considered to be consistent with the effects analysis. Table 114 and table 115 show the compliance evaluation and documentation requirements to also demonstrate this compliance. Sections A through E provide direction that would be used by implementation personnel to ensure that implementation meets the purpose and need and forest plan standards and guidelines. It is also the foundation for the formal silvicultural

monitoring. The purpose of the qualitative implementation compliance monitoring is to answer the question: "Was the job done correctly?" The need for qualitative implementation monitoring increases rapidly with the complexity of the actions undertaken. Complex forest restoration prescriptions implemented using designation by description (DxD) or designation by prescription (DxP) create substantial room for interpretation by the operators, and may result in outcomes substantially different on the ground from those intended by the resources specialists who wrote the prescriptions. Verifying that implementation complies not only quantitatively but qualitatively with the management decision is especially important when the third step of monitoring is intended, as effectiveness can only be meaningfully analyzed if the actual treatments outcomes are in compliance with the intended outcomes. Specific qualitative implementation compliance monitoring measures can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. 3)Multi-tier and multiple scales effectiveness monitoring. The purpose of the effectiveness monitoring is to answer the question: "Do the outcomes of the management decision produce the intended effects?" The need for effectiveness monitoring increases rapidly with the complexity and spatial and temporal scopes of the management actions undertaken, especially in projects where cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions. Landscape scale forest restoration over 2 million acres in 20 years, as endeavored in the 4FRI project, is largely inconceivable without the concept of adaptive management. However, adaptive management is but an empty rhetoric, and any management action and the NEPA analysis thereof is flawed if robust three step monitoring as described here above is not planned and implemented. Specific effectiveness monitoring processes can be defined at the planning stage and specific resources requirements can be calculated at the planning stage. The 'action plan' or 'work plan' must include, disclose and commit the Responsible Officials to provide the resources and budget required. A three functional steps

prescriptions. The silvicultural prescriptions will document the desired conditions presented in the analysis, incorporate design features and mitigation (appendix C), and provide the course of action needed to move toward those desired conditions"□ (DEIS, page 601). Furthermore, appendix E of the FEIS provides a plan for not only additional implementation and compliance monitoring, but also effectiveness monitoring. Regarding funding, the Plan was developed in collaboration with our stakeholder partners with the full understanding that budgetary constraints will have an effect on our ability to monitor the full suite of questions. The operating budget is contingent upon the available funds as appropriated by Congress on an annual basis. As such, monitoring questions were prioritized with the intent of first meeting regulatory requirements and then providing additional information that is important for effective adaptive management. The Forest Service and its stakeholder partners are committed to rigorous social, economic and ecological monitoring. In light of that commitment, the Forest Service will annually set aside a portion of the CFLR funding it receives specifically to support monitoring. We will also continue to actively work with our stakeholder partners to leverage additional funds to expand the scope of our monitoring efforts. Where sections of the Plan continue to lack specific details it is because it is not possible to determine the answer until the Multi-Party Monitoring Board and the Forest Service collaboratively agree on the specific monitoring protocols. The multi-party monitoring board is developed independently within the stakeholder group. If provided prior to publication, a stakeholder developed document outlining the structure of the board can be included in an appendix to the FEIS. As outlined in the collaboratively developed adaptive management and monitoring plan, the multi-party monitoring board will work with the USFS, where appropriate, to oversee monitoring prioritization, implementation, data storage and assessment. Furthermore, the plan states that the stakeholder group (and by association, the monitoring board) will provide adaptive management recommendations to the Forest Service based on the monitoring information collected.

	monitoring process articulated as above can be easily adapted to the three priority tiers identified in the 4FRI stakeholders suggested monitoring plan (2012) and the three monitoring scales identified in Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 660). In presenting the above monitoring process, Apache County does not intend to propose an alternative to the stakeholders developed Biophysical and Socioeconomic Monitoring for the Desired Conditions of the Four Forest Restoration Initiative plan, but to suggest a framework for the associated monitoring 'action plan' or 'work plan' and budget required under FSM Sec. 1921.51 (4) & (5).	
White, Tom	Apache County respectfully suggests that the 4FRI DEIS include in very specific terms the requirements for the Responsible Officials to be bound by the findings of multi-party monitoring boards. It is not suggested here that responsible officials surrender their decision making authority to a multi-party monitoring board, or violates the requirements of FACA, but that they should be required to act upon the findings of a multi-party monitoring board in a manner that appropriately addresses the issues raised.	(184-66) As described in appendix E (Adaptive Management, Biophysical, and Socioeconomic Monitoring Plan, also known as the Adaptive Management and Monitoring Plan, or AMMP), the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. The deciding official will then consider potential adaptive management actions and make a final determination. However, the Government cannot surrender its decision making authority to the multi-party monitoring board.
White, Tom	Apache County observes that the words 'adaptive management' are used in 61 distinct instances throughout the 4FRI DEIS, and that adaptive management is referred to, throughout the entire 4FRI DEIS, as an integral part of the 4FRI project and as a management tool fully integrated in the 4FRI NEPA process. The County applauds the commitment of the USFS 4FRI Team to adaptive management, as projects on the scale of 4FRI (~2 million acres in 20 years), or even the first DEIS of 4FRI (~1 million acres in 10 years), where direct, indirect and cumulative effects analysis assumes a speculative nature owing to the scale and duration of the management actions, are largely inconceivable without the concept of adaptive management. However, Apache County observes that aside from a five line description in the Glossary (DEIS p. 341), and a nine line general description in the Appendix E Alternative B through D Monitoring and Adaptive Management Plan (DEIS p. 661-662), there is no presentation or description in the 4FRI DEIS, the specialists reports or the project record, of the adaptive management process. The entire	(184-67) The comment refers to the 2012 Planning rule; however, 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity". In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management. We agree that the site specific monitoring and adaptive management plan in the DEIS was incomplete. Please refer to Appendix E and the updated AMMP in the FEIS for a more detailed definition of the adaptive management process including clarifying figures and adaptive management activities proposed in response to threshold triggers.

	adaptive management plan for the 4FRI project is described as follows: "Monitoring of alternative management actions provides the data for the adaptive management process. As a result of comparing monitoring results to the predicted outcomes, the plan provides a roadmap for adjusting actions or applying new science as long as the anticipated effects are within the scope of impacts analyzed and disclosed in the EIS and record of decision" (DEIS p. 661-662). The fundamental issues of characterization of system uncertainty through multi-model inference; definition of temporal and spatial scales; indicators selection; analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; identification of thresholds; evaluation of strategic alternatives; amplitude, timing, scale and iteration of corrective actions; etc., are left untouched. Additionally, as mentioned in the above section Monitoring, Apache County also observes that Table 145 Effectiveness Monitoring Plan actually seems to be more an attempt at an adaptive management decision matrix rather than an effectiveness monitoring plan per se. The table includes some indicators, triggers, and adaptive actions based on landscape scale desired conditions, but many adaptive actions applying to macro level desired conditions are "discontinue" or "prohibit until alternative approach is development (sic)" or "increase" or "re-evaluate". These are binary or vague. In addition, many of the triggers timelines are 5 or even 10 years long, which may be adapted for some resources, but may not allow, for other resources, the identification of trends, and the implementation of adaptive management actions before the entire 4FRI project, or half	
White, Tom	of it, is completed. Similarly, the few lines of adaptive management narrative are vague and general: "Some of the effectiveness monitoring objectives have adaptive management actions that would be taken if the established thresholds are reached or exceeded. Alternatives B, C, and D have specific adaptive management actions for springs, channels, and roads that have been made part of the alternative (see DEIS chapter 2)" (DEIS p. 662). Apache County is concerned that adaptive management is only a concept at this stage; that the specialized	(184-68) Thank you for your observations. Please see previous responses.
White, Tom	techniques and processes of adaptive management may not be fully	(184-69) Thank you for your comment. See previous responses.

White, Tom	grasped; and that adaptive management has not been truly engineered into the 4FRI project as an executable management mechanism integral to the 10 year implementation of the 4FRI EIS over one million acres. Further, Apache County is concerned by the reaction to date of the USFS 4FRI Team to such observations: "Adaptive management is not a NEPA requirement." The County is concerned that, while it is correct that adaptive management is indeed not a NEPA requirement in the 1982 Planning Rule, it has become one under the 2012 Planning Rule (Forest Service Handbook FSH 1909.12 - 41). Maybe more importantly, the County is concerned that by making adaptive management a key process of the 4FRI NEPA analysis, the USFS 4FRI Team has in effect constrained itself into designing and implementing a true adaptive management process. Therefore, Apache County is concerned that the absence of a robust adaptive management process, despite the stated reliance on adaptive management to implement restoration treatments on one million acres over 10 years, may present a process risk for the 4FRI DEIS. Consequently, Apache County is concerned that the possible process risk for the 4FRI DEIS potentially caused by the absence of a structured adaptive management plan, presents a consistency gap between the 4FRI DEIS and the County's objectives as expressed in its plans and policies and in these comments.	(184-70) The comment refers to the 2012 Planning rule. Please see the response to #76-4 for information about the relevant rule planning rule under which the 4FRI was initiated. However, the 2012 Planning rule at 36 CFR 219.12 (a) (7) makes clear that "This section not apply to projects or activities. Project and activity monitoring may be used to gather information for the plan monitoring program, and information gathered through plan monitoring may be used to inform development of projects or activities. But, the monitoring requirements of this section are not a prerequisite for making a decision to carry out a project or activity"□. In either case, both the current and draft versions of FSH 1909.12 provide direction for only forest plan level monitoring and adaptive management.
White, Tom	Apache County respectfully suggests that the USFS 4FRI Team develop and include in the 4FRI EIS a robust adaptive management plan that includes standardized processes such as: Characterization of system uncertainty through multi-model inference; Definition of temporal and spatial scales; Analysis of indicators selection; Analysis, modeling, and conclusiveness of quantitative, qualitative and effectiveness multi-tier and multiple-scale monitoring data; Analysis of thresholds; Analysis of strategic alternatives; and, Analysis of amplitude, timing, scale and iteration of corrective actions.	(184-71) Thank you for your suggestions. The adaptive management and monitoring plan was developed in collaboration with stakeholder group through an open and public process. This process involved in-depth multi-party discussions on a wide range of socio-economic and ecological issues. Since its inception, the plan was intentionally designed to be a living document that will adapt over the course of the project as information is gained and new questions are revealed. In January of 2014, the current iteration of the adaptive management and monitoring plan was approved by the 4FRI stakeholder group for inclusion into the FEIS. Your participation in that process is appreciated. We feel that the plan is a robust and well thought out document that establishes the proper framework for the Forest Service to not only monitor the effects of restoration activities, but also adapt as new information is made available.

White, Tom	In its review of the proposed directives revising the Forest Service Handbook (FSH 1909.12) and the Forest Service Manual (FSM 1920), and establishing procedures and responsibilities for implementing the 2012 National Forest System Land Management Planning Regulation set out at 36 CFR part 219, Apache County identified issues and shortcomings that are likely to affect the 4FRI DEIS. Apache County fully understands that the opportunity to comment on the 4FRI DEIS is neither an opportunity to comment on the 2012 Planning Rule, nor on its implementation directives. Nonetheless, precisely because the 4FRI DEIS will establish the parameters for all subsequent management actions in the 4FRI project for the upcoming 10 years or more, the County believes that it is appropriate for the 4FRI EIS to specifically include and, therefore, integrate into any subsequent management action, guidelines on: i) how to use of best available scientific information to inform the land management planning process; ii) public participation and the role of collaboration; and, iii) the objection process.	(184-72) Please see the responses to the individual issues such as the use of best available science, public participation and the 36 CFR 218 objection process.
White, Tom	Apache County appreciates and supports the important role given to the use of best available scientific information to inform the land management planning process in the proposed directives and in the 4FRI DEIS. Apache County further appreciates and supports the important role given to assessing social and economic sustainability and multiple uses in the assessment process. Issue However, Apache County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials in actually integrating social and economic sustainability and multiple uses, and in integrating social and economic science to the framework of best available scientific information to inform their land management planning process, and their management decision making process. Specifically, the assessment of the social, cultural and economic values becomes essentially an exercise in futility if these values are not reflected in the management decisions, and do not balance other values. This lacking is reflected in the 4FRI DEIS. Apache County clearly supports robust science and the full integration of ecological, bio diversity, restoration and conservation values in the management process, and the County is on record for participating in, and often leading, efforts designed to re-introduce	(184-73) Thank you for expressing your opinion. Please see all previous responses.

to the ecosystems of eastern Arizona natural ecologically sustainable processes such as a frequent cool surface fire regime. Nevertheless, the County is observing, and when necessary is committed to mitigate, a tendency to develop and implement pure, uncompromised and uncompromising science, or the currently accepted state of best science - which often proves to be a temporary state, to the detriment of the enjoyment, custom, culture, health, safety and economic well-being of the people. Additionally, Apache County is also observing, and when necessary is also committed to mitigate, the fact that the same temptation to develop and implement pure, uncompromised and uncompromising science also often causes the weakening of the social consensus with stakeholders who would support the implementation of management decisions based on a balanced approach, but are unwilling to support the invasive implementation of a monolithic and intransigent interpretation of science. For example, many stakeholders are reluctant to support unconditionally the 4FRI DEIS, owing to the science-based decision to cut some of the large trees necessary for the development of the future old growth, in order to create regeneration openings in the name of scientifically driven silviculture. Such decisions may make sense at group level, in forests featuring well balanced classes of vegetative structural stages (VSS), but are difficult to support at stand level or forest level in forests where older VSS classes (VSS 5 and 6) are in recognized deficit at landscape scale, while younger VSS classes (VSS 2, 3 and 4) are overabundant, choke the landscape, and transform it into a ticking fire bomb.

Apache County suggests that the 4FRI EIS provide clear and unambiguous guidelines to responsible officials to integrate social sustainability and social science into the framework of best available scientific information to inform their management decision making process. Specifically, Apache County suggests that the 4FRI EIS guide responsible officials to implement substantive - even though possibly scientifically imperfect - management actions that move the ecosystems significantly toward the desired future conditions, when such actions are supported by social consensus, rather than spend

White, Tom

years attempting to forcibly impose management actions that may

(184-74) The 4FRI planning effort has lived up to the spirit of authentic collaboration since the inception of the idea to restore 2.4 million acres across northern Arizona. A working relationship was built with the stakeholder's group, and beginning in 2010, collaborative planning efforts include but are not limited to, the use of the stakeholder's Landscape Restoration Strategy to inform the purpose and need and proposed action for this project. In addition, the stakeholder's group produced the Large Tree Retention and Old Growth Protection Strategy which was used to inform alternatives and the modified version is incorporated in the project's implementation plan. The collaborative

	be deemed scientifically more perfect but that do not benefit from the support of the social consensus. In other words, the County suggests that the 4FRI EIS emphasize executing well less than perfect projects now, over developing scientifically perfect projects that are not implemented. To quote a famous Arizonan: "Extremism in the defense of liberty is no vice" (Barry Goldwater), but Apache County would like to propose to the USFS 4FRI Team that extremism in the pursuit of best available scientific information (BASI) may become counterproductive when it results in paralysis by analysis, or inaction by litigation.	effort continues with the participation of the stakeholder group in developing the adaptive management and monitoring plan which is included in the FEIS. Evaluating monitoring information and data gathered about the ecological and socioeconomic components affected by restoration activities creates the feedback necessary for making any adaptive management decisions. As described in appendix E and the AMMP, the Forest Service will respond to issues raised by the multi-party monitoring board by evaluating monitoring data and stakeholder recommendations. Because the Forest Service can neither abdicate its legal responsibilities nor delegate decision-making to the collaborative group, the deciding official will consider potential adaptive management actions and make a final determination. All collaborative decisions still need to move through procedures for agency evaluation and accountability.
White, Tom	Apache County appreciates and supports the important role given to public participation and the role of collaboration in the proposed directives and in the 4FRI DEIS. Issue However, Apache County believes that the proposed directives miss a critical opportunity to provide substantially clear directives to responsible officials on two fundamental and overlapping aspects of public participation and the role of collaboration. Specifically: i) sustained and meaningful public participation and engagement require that the public's input actually influence substantially the decision making process; and, ii) sustained and meaningful collaboration requires that the products of collaboration be honored by the Forest Service. This lacking is reflected in the 4FRI DEIS. Apache County has acquired a long, ineffective, inefficient, unproductive and oftentimes frustrating experience of responsible officials paying lip service to public participation and to the role of collaboration, and the County believes that the 4FRI EIS must focus the concept of public participation and collaboration away from complying with a process and 'managing the problem,' toward developing executable products and 'resolving the problem.'	(184-75) Please see the response to #184-74.
White, Tom	Apache County recognizes that under current federal statutes Forest Service line officers are not allowed to share their decision making authority. Nonetheless, the County believes that a statutory monopoly of decision making authority does not necessarily imply an	(184-76) Please see the response to #174-76.

	operational monopoly on decision content. Therefore, the County suggests that the 4FRI EIS emphasize that while the line officers retain their sole legal ability to make the decision, they are also required by law and regulation "to meet the needs of present and future generations" (Forest Service Mission Statement), as expressed through true public participation and collaboration, and meaningful consistency reviews with the local governments' objectives, among other channels. Apache County further suggests that the 4FRI EIS guide responsible officials in retaining their legal decision making authority while allowing the public to participate meaningfully in, influence substantially, and, when appropriate, contribute to alter the content of their decision. Apache County appreciates the attempt made by the Forest Service to: i) allow the public a more effective involvement; ii) support the collaborative processes; and, iii) develop better decision-making (U.S. Forest Service Chief Tom Tidwell) by replacing the previous appeal process with the new pre-decisional administrative review, or "objection process", to be applied under federal regulation to all projects and activities that implement land-management plans and that are documented in an environmental assessment or environmental impact statement. Apache County acknowledges that the U.S. Forest Service announced on March 26, 2013 the final rule governing the objection process for projects and activities implementing land-management plans, and that the final rule was published in the Federal Register on March 27, 2013 after a review of public comments submitted in response to the publication of the proposed rule in 2012. Consequently, the County fully understands that this comments letter is not an opportunity to comment on the	
White, Tom	objection process. However, Apache County believes that the recent decision made by the Forest Service to replace the previous appeal process with the new objection process in the 4FRI NEPA process does provide an opportunity to address concerns about the objection process implementation, as follows. Among other significant differences, a critical difference between the previous appeal process and the new objection process is that an objection must be filed prior to an actual	(184-77) Thank you for your comment.
White, Tom	decision being made and published. This creates a potentially	(184-78) Please see the response to #184-63.

White, Tom	difficult situation inasmuch as there is a possibility, and in certain cases a probability, that several objections may be filed by several different parties, and that the resolution of these objections may result in a final decision significantly different from the one disclosed in the document published with the notice of a plan subject to objection. Although the list of objections will be public, the timing of filing of potential objections within the objections filing period may result in the requirement for the public to decide to file, or to abstain to file an objection based on the speculation of what other parties may decide to file, and what the resolutions to such objections might be. Additionally, since a final decision may be influenced significantly by the resolution of an objection that, by definition, happens only after the comments period is closed, parties may be unwillingly put in a situation where, per 51.52 - Issues Not Based on Previously Submitted Substantive Formal Comments, their potential objection may be ineligible. Additionally, Apache County is concerned that Chapter 50 Objection Process in general, section 51.66 - Reviewing Officer Response to Objections and section 51.6 - Resolution of Objections in particular, and specifically section 51.6 paragraph 4: "The reviewing officer responds to the outstanding issues in the objection; The reviewing officer's response may include instructions to the responsible official as part of the disposition of the objection. The response must be sent to the objecting party(ies) by certified mail, return receipt requested, and posted online" (36 CFR 219.57(b) and sec. 51.64) are focused on the administrative process of disposing of an objection, rather than on the substantial process of actually resolving it. Apache County suggests that the 4FRI EIS guide the reviewing officers to exercise careful judgment in their resolution or rejection of objections, in relation to the true material importance of the objections - as opposed to their symbolic or emotional importance, and the potential effect of litigation on the implementation of the project. The County suggests that a careful and dispassionate costs / benefits analysis be conducted between the minor ecological or silviculture costs possibly attached to some stakeholders' objections, and the major benefits attached to sustaining the 4FRI social license. In so suggesting, Apache County wants to emphasize that it does not	(184-79) Thank you for interest in and concern for this restoration project.

White, Tom	promote indiscriminate and aberrant acceptance of any and all parties' whims or irrational demands, but a well-considered costs and benefits analysis by Forest Service responsible officials, line officers and reviewing officers of public input in their decision process in view of the relative actual significance or lack thereof of such input, and the overwhelming urgency to act, even if imperfectly in some specific cases, such as the protection of the forests of eastern Arizona against catastrophic landscape scale wildfires. In summary, Apache County wants to re-state its overwhelming support for the 4FRI project, the 4FRI DEIS effort, and the implementation of the 4FRI Preferred Alternative, provided that it is further refined per the suggestions provided by the County and other stakeholders integral to the sustainability of the 4FRI social license. Therefore, the concerns and suggestions provided by Apache County are not aimed at questioning the need to implement 4FRI, but at pointing out to the USFS 4FRI Team potential issues, gaps or weaknesses in the substance and the process that could be of a nature to compromise a non-conflictual and non-litigious implementation of the 4FRI project, as intended by the County	(184-80) Thank you for your comments and support of this landscape-level restoration effort.
White, Tom	Apache County is fully aware that per Sec. 1503.4 Response to comments, the USFS 4FRI Team may elect to "Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response" (Sub Sec. 5). However, this is not the expectation of the County. Rather, the County expects that the USFS 4FRI Team will receive the County's comments in the spirit of continuous improvement and risk mitigation in which they were written, and elect to "Modify alternatives including the proposed action" (Sub Sec. 1), and "Supplement, improve, or modify its analyses" (Sub Sec. 3) as allowed for under Sec. 1503.4.	(184-81) Your comments have been noted. Thank you for your involvement in the 4FRI DEIS comment process.
White, Tom	Apache County respectfully submits that the above comments and suggestions are substantive in nature and warrant careful consideration and adoption by the Forest Service. Apache County requests to be kept informed as the 4FRI NEPA process progress; hereby reserves its right to provide further comments as the process unfolds; and, requests that the Forest Service commit to receiving	(184-82) Thank you for your comments.

	and integrating further comments from the County as provided. Apache County appreciates the opportunity to comment on the 4FRI DEIS and thanks the USFS 4FRI Team for this opportunity. The County is committed to partner with the U.S. Forest Service to meet the County's residents' and visitors' enjoyment, custom, culture, health, security and economic well-being needs. Developing the concept of industry funded landscape scale restoration in Arizona; Fostering the collaborative agreement that resulted in the 4FRI project; Organizing the political support at the state and federal levels that made 4FRI possible; Lobbying for the funding of landscape scale restoration in general, and 4FRI in particular, through the Collaborative Forest Landscape Restoration Program (CFLRP); and, Resolving regulatory issues with the U.S. Department of Agriculture (USDA) and the U.S. Forest Service Washington Office (USFS WO), such as the cancellation ceiling issue, which hindered the implementation of industry funded landscape scale restoration. Does science support the direct transfer of canopy density guidelines, originally designed to be implemented at stand or even forest scale, to groups (within stands)? How does canopy openness measured at group level compare with the reference condition? How and at what scale will post-treatment openness be measured in 4FRI? Does a range of basal area of 50 to 70 in the largest treatment categories provide enough flexibility for a full range of treatments, considering other metrics such as trees per acre (TPA), stand density index (SDI), percentage of interspace, and percentage of openings? How will habitat be provided to closed canopy and high closed canopy dependent species in the post treatment interim between the thinning of their current habitats and the natural development of high and dense canopy cover in the future old growth?	
White, Tom		(184-83) This portion of the letter was appended to facilitate coding and has been responded to earlier in the comment letter.
Whitefield, Paul	Thank you for the opportunity to review and comment on the raft Environmental Impact Statement (DEIS) for the Four Forest Restoration Initiative (FRI). The proposed fire risk reduction and forest health restoration actions under the DEIS are in proximity to and have the potential to affect visitor experience, and cultural and natural resources within Walnut Canyon and Sunset Crater Volcano National Monuments. The Coconino National Forest is already	(118-1) Thank you for your comment. We are pleased to see that you support the restoration of the ponderosa pine forests adjacent to the Flagstaff Area Monuments.

	implementing numerous smaller-scale projects covering much of the watersheds and viewsheds for the two national monuments, including the Mountainaire, Elk Park, Eastside, Jack Smith-Schultz, and Marshall wildfire risk reduction and forest health restoration projects. The 4FRI would address fire risk reduction and forest heath within the remaining watershed and view-shed areas.Over the last eight years, resource management staff with the Flagstaff Area National Monuments have participated in the Coconino National Forest's collaborative planning process for these earlier projects. As a result, NPS concerns were addressed while planning the earlier projects, and are being carried forward into the landscape-scale 4FRI. The 4FRI action alternatives are also being collaboratively planned with the Greater Flagstaff Forest Partnership and other stakeholders, incorporate the best available ponderosa pine fire ecology science, and fully involve the U.S. Fish and Wildlife Service in the design and implementation of treatments in Mexican spotted owl habitat. The three action alternatives under the 4FRI DEIS are each well planned and will meet mutual NPS objectives for ponderosa pine forest restoration, wildfire risk reduction, wildlife habitat management, watershed function, and scenic quality retention within Walnut Canyon and Sunset Crater Volcano National Monuments. The NPS fully supports the need to address existing conditions, along with implementing one of the three action alternatives under the	
Whitefield, Paul	Final Environmental Impact Statement. Thank you very much for the opportunity to comment on this EIS.	(118-2) Thank you for taking the time to comment and for the support of this important restoration project.
Williams, Denise	Seriously, what are you thinking? Burning forests so you can replant them to suit man's design? What about all the life you are going to destroy, not to mention all the animals homes? All the pollution you'll create? Don't you think God and Nature know better than you? Please stop this nonsense and don't do this.	(131-1) Thank you for your comment.
Williamson, Martha	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on	(191-1) Thank you for your comment and interest in the 4FRI. Please see the response to letter #19.

	restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project. Sincerely, Ms. Martha Williamson 118 Olympic Cir Vacaville, CA 95687-3306	
Winn, Russell	Please find attached to this message and pasted below a letter from five conservation organizations commenting on the Draft	(Letter 200) Please see our response to letter 196.

	Environmental Impact Statement for activities connected to the Four Forest Restoration Initiative in the Coconino and Kaibab National Forests. All attachments described in the comment letter are embedded in the PDF document.	
winsten, martha	Destruction by burning of Ponderosa pine in the southwest I think that it is shocking for the government to bring in loggers to cut the Ponderosa pine and then to subsequently come in every 5 years and to burn what is left.I am totally opposed to this. Martha Winsten,150 Old West Rd., Gansevoort, NY 12831.	(100-1) Thank you for your comment. The ponderosa pine ecosystem evolved with a frequent-fire regime and one facet of the 4FRI restoration project is to reestablish the conditions that allow naturally occurring fires to burn. This in turn would reduce the risk of uncharacteristic wildfire in the future.
Wolf, Pauline	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document	(132-1) Thank you for your comments. Please see our response to letter 19.

	that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Wolff, Ted	Ted---thanks for the call. Because we are in a formal comment period for our 4FRI DEIS, I'm going to use this email to document our phone call for our project record (pardon the length---also, if I got something wrong, please e-mail me and let me know where I got stuff wrong so I can get it correct in the record correctly). In response to your question about the comment period we are in the formal comment period now for the DEIS. The comment period closes. May 29, 2013. The word document attachment shows how to make an electronic comment.	
Wolff, Ted	Ted---thanks for the call. Because we are in a formal Extension]comment period for our 4FRI DEIS, I'm going to use this email to document our phone call for our project record (pardon the length---also, if I got something wrong, please e-mail me and let me know where I got stuff wrong so I can get it correct in the record correctly.). In response to your question about the comment period, we are in the formal comment period now for the DEIS. The comment period closes. May 29, 2013. The word document attachment shows how to make an electronic comment.	
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Wolff, Ted	Separate from the DEIS you had questions on who has the responsibility of maintenance for haul roads under 4FRI contracts (county supports the initiative, but is concerned over effects of hauling on county roads). The answer is, it depends on the contract type. For the current 4FRI stewardship contract, the contractor is responsible for maintenance on the haul routes until they hit public	(1-4) This was a request for general information that was resolved by Assistant IDT Dick Fleishman on May 29, 2013. No further response is required.

	roads. Once they hit public roads, it is gas tax revenues that guide funding for maintenance. Maintenance usually means at least a pre-haul/post haul blading and may require intermediate blading depending on the number of loads and duration of haul across a road. There is no surface rock replacement within the contract, so we would not expect surface rock to be replaced after the contract is completed hauling in a specific location. On a regular timber sale, you have pre-and post-haul maintenance as well, but can collect surface rock replacement. The amount collected is usually small, so there usually is not rock placed after a contract, but could be possible. The maintenance requirements in either contract does have the ability for some spot surfacing, but if the whole roads needs surface rock that would be something the Forest Service would do before a task order to the contract if it has the funding available (we have been able to do some of this work on roads the last couple of years---but it is funding available and is not guaranteed). As for the rock pit NEPA, it will benefit 4FRI, but is a separate action to maintain our road existing systems. The use of those pits by the county will still be governed under existing agreements between the Forest Service and the County. I did discuss that there is some possible funding scenarios that the state is looking at for roads and we discussed some county roads that would have hauling on them; and specifically talked about some of the paved roads that the county maintains (141, 73, route 66 on the Kaibab, primarily FH-3 on the Coconino with some material off of the dump road). I told Ted I would share a list of county roads that may be used for haul on the Coconino and Kaibab that is from our roads database (it's attached in an excel spreadsheet). Please don't hesitate to give me a call if you have further questions.	
Wolff, Ted		(1-5) This was a request for general information that was resolved by Assistant IDT Lead Dick Fleishman on May 29, 2013.
Wolff, Ted		(1-6) This was a request for general information that was resolved by Assistant IDT Leader Dick Fleishman on May 29, 2013.
Wolslegel, Thomas	Please accept these comments on the Four Forests Restoration Initiative Draft Environmental Impact Statement. As someone who enjoys and appreciates the values provided by our national forests, I have a strong interest in the Four Forest Restoration Initiative (4FRI) and an interest in seeing healthy forests with sustainable populations of native wildlife, functioning rivers and streams, old growth trees, and grasslands and springs. While I appreciate the 4FRI's focus on restoring natural processes, using prescribed fire, and protecting	(59-1) Thank you for your comments. Please see our response to letter #19.

	wildlife habitats and communities, I have some concerns with the way the project is currently being proposed and questions about whether the proposed action will accomplish these goals. I ask that the Forest Service address these concerns in its Final Environmental Impact Statement and Implementation Plan. The project as proposed is vague about how "open" the forests will be if it is implemented as outlined in the DEIS. This is important as it could negatively affect a number of wildlife species that depend on forest canopy, including the northern goshawk. Because of the different definitions of the various forest openings and the fact that they do not overlap, it could mean many more trees are cut, resulting in significantly less canopy cover and a much larger and negative impact on these canopy-dependent species. The Forest Service should provide more specific guidelines for the sizes of each of the openings outlined in the proposed action and, overall, how much openness will be created cumulatively by these openings. Also, guidelines should be provided so that tree groups and forest opening sizes are varied. The goal is to restore a healthy, functioning forest, not to create uniformity across the landscape. Stakeholders, including Sierra Club and other conservation groups, developed a document that specifies that old growth and larger trees should be protected, with a few limited exceptions. The Forest Service should make this document on large tree retention and old growth protection an integral part of the proposed action. I strongly support retaining all old growth and larger trees to the greatest degree possible in these national forests. The Forest Service needs to be specific about how it will monitor and adaptively manage the forests during and after 4FRI implementation and how it will pay for monitoring. Monitoring must include determining effects on wildlife, snowpack, soil moisture, habitat connectivity, and long-term tree survival. This is especially important in light of the impacts of climate change. Thank you for incorporating these comments into the Final Environmental Impact Statement for the 4FRI project.	
Worsham, Michael	I am opposed to USFS plans to thin and burn one million acres of Arizona forest, including 98% of protected habitat for the Mexican Spotted Owl, and to plan to burn every area of the forest every five years. I also oppose plans to allow or invite any logging companies to	(81-1) Thank you for your comment.

harvest 300,000 acres of trees or any trees. Thank you.