The Kaibab Forest Health Focus

Collaborative Prioritization of Landscapes and Restoration Treatments on the Kaibab National Forest

A Report to the Kaibab National Forest *from*

The Forest Ecosystem Restoration Analysis Project

Northern Arizona University

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ForestERA
Forest Ecosystem Restoration Analysis
Applied Ecology Lab,
School of Earth Sciences and
Environmental Sustainability

The Forest Ecosystem Restoration Analysis Project (ForestERA) is part of the Landscape Ecology and Conservation Biology Lab, itself part of the Applied Ecology Lab located in the School of Earth Sciences and Environmental Sustainability at Northern Arizona University. More information is available online at www.forestera.nau.edu and www.cefns.nau.edu/Academic/EnvSci/Lab/

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Kaibab Forest Health Focus Collaborative:

The driving force behind the Kaibab Forest Health Focus were the participants and their time and energy they contributed to this process. The people listed below came together in a series of meetings from January to June 2009 to provide guidance to the Kaibab National Forest on priority areas for ecological restoration treatments for the purposes of reducing fire hazard to communities, protecting and improving wildlife habitat and restoring forest health. This process also provided treatment guidance in these priority areas. The ForestERA team supported this collaborative through science, spatial analysis and facilitation. This document describes the process and outcomes of this effort and, to the best our ability, represents the collective work of this collaborative group.

The ForestERA Project Science and Analysis Team:

Thomas D. Sisk, Ph.D.	Northern Arizona University
Jill M. Rundall	Northern Arizona University
Erik Nielsen, Ph.D.	Northern Arizona University
Brett G. Dickson, Ph.D.	Northern Arizona University
Steven Sesnie, Ph.D.	Northern Arizona University

Invited Participants (Alternates)

Ethan Aumack	Grand Canyon Trust
Bill Austin	US Fish and Wildlife Service
Pascal Berlioux	Arizona Forest Restoration Products, Inc.
Ed Smith (Alt: Brenda Burman; Sarah Hurteau)	The Nature Conservancy
Kim Crumbo	Grand Canyon Wildlands Council
Rick Erman	Friends of Anderson Mesa
Pete Fulé	NAU, Ecological Restoration Institute
Steve Gatewood	Greater Flagstaff Forest Partnership, Wildwood Consulting, LLC
Angela Gatto	KNF, North Kaibab Ranger District
Martha Hahn	Grand Canyon National Park
Stacy Hamburg	Sierra Club
Shaula Hedwall	US Fish and Wildlife Service
Mark Herron	KNF, Williams Ranger District
Bruce Higgins (Alt: Holly Kleindeinst)	Consultant - KNF, Supervisor's office
LeAnn Skrzynski	Kaibab Band of Paiute Indians
Jim Koons	Public participant
Ariel Leonard	KNF, Supervisor's office
Taylor McKinnon (Alt: Jay Lininger)	Center for Biological Diversity
Jim Matson	Vermillion Services
Frank McNelly	Coconino County Resource Conservation District
Andi Rogers	Arizona Game & Fish Department

Observers and KFHF resource personnel

Alvin Brown	Kaibab National Forest
Garry Domis	Kaibab National Forest
Beatriz Dugay	Kaibab National Forest
Valarie Foster	Kaibab National Forest
Haydee Hampton	Northern Arizona University
Mark Herron	Kaibab National Forest
Chris Holcomb	Northern Arizona University
Yewah Lau	Coconino National Forest
Amber Lidell	Kaibab National Forest
Stu Lovejoy	Kaibab National Forest
Dennis Lund	Ecological Restoration Institute
Dave Mertz	Kaibab National Forest
Dave Mills	Kaibab National Forest
Charlotte Minor	Kaibab National Forest
Lauren Mork	Northern Arizona University
Lucy Murfit	NAU, Ecological Restoration Institute
Bill Noble	Kaibab National Forest
Mikele Painter	Kaibab National Forest
Chris Ray	Northern Arizona University
Martie Schramm	Kaibab National Forest
Jared Scott	Kaibab National Forest
Joe Seidenberg	Ecological Restoration Institute
Tim Short	Kaibab National Forest
Doug Ottosen	Kaibab National Forest
Matt Tuten	NAU, Ecological Restoration Institute
Linda Wadeigh	US Forest Service , Region 3
Jeff Waters	Kaibab National Forest
Mike Williams	Kaibab National Forest

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Executive Summary

In September, 2008, the Kaibab National Forest (KNF) launched the Kaibab Forest Health Focus ("the Focus"), a science-based, collaborative effort to guide future landscape-level forest restoration efforts. At that time, the KNF announced that, if a high level of agreement could be reached through the Focus, future projects would be developed to advance the resulting recommendations to implementation. The KNF contracted with the Forest Ecosystem Restoration Analysis (ForestERA) Project at Northern Arizona University's (NAU's) Center for Sustainable Environments to complement KNF's scientific capacity by providing spatial modeling and analysis, and to facilitate a series of stakeholder meetings. The effort produced a series of recommendations regarding high-priority areas on all three Districts of the Kaibab National Forest, and provided guidance regarding restoration treatments and other appropriate management actions in those areas. Stakeholders also identified and discussed a series of important issues of interest, providing additional guidance for building public support and advancing ecological restoration objectives toward on-the-ground implementation. This report presents the findings, recommendations, and guidance that emerged from this collaborative, science-based effort to leverage the combined capacity of the Forest Service, NAU, the wood products industry, conservation groups, and other engaged stakeholders.

Purpose & Objectives

The Kaibab National Forest is looking ahead to future projects and planning efforts. In an effort to engage stakeholders at the beginning of such efforts, and to pursue future management within the context of comprehensive, landscape-scale forest restoration, the KNF planning staff designed the Kaibab Forest Health Focus to identify areas on each of the three Districts where the objectives of ecological restoration and fire threat reduction might be pursued in a socially viable and ecologically sound manner. The KNF and partners, assisted by the ForestERA Project, worked together to engage and support stakeholders to

- Identify high-priority areas for forest treatments that would involve mechanical thinning and/or prescribed fire;
- Develop data, conduct analyses, and evaluate outcomes that will inform the future work of forest managers, and
- Build strong public engagement and outcomes that have a high degree of public support.

To these ends, the Focus created a structured stakeholder process for advancing planning and management efforts in a manner that links the Forest Service's national and regional objectives with District-level decision making, while responding to the needs, objectives, and constraints as articulated by the Kaibab National Forest staff, collaborating agencies and organizations, and the public. Within this collaborative framework, participants in the Kaibab Forest Health Focus worked to:

- Draw from and expand upon previous collaborative assessment and analysis, including the Western Mogollon Plateau Landscape Assessment, the Statewide Strategy for Restoring Arizona's Forests, and the Analysis of Small-diameter Wood Supply for Northern Arizona.
- Consider sets of desired forest conditions that are within the historic range of variation for forest structure and fire behavior.
- Consider and propose forest treatments that would restore fire-adapted ecosystems and reduce the risk of stand-replacing fire across the Forest's three districts
- Evaluate the feasibility and likely effectiveness of treatments
- Identify areas of agreement and disagreement among working group members and stakeholders

Overall, the Focus was designed to provide a new model for public engagement and assessment of Forest Service lands, one that linked near-term decisions and planning efforts to the results

from previous landscape assessments and analyses. Through this effort, Focus participants, including the Forest Service, committed themselves to the shared objective of "down-scaling" from the aspirational goals of previous efforts to practical recommendations to guide project-level planning and future implementation in a manner that will identify areas of agreement, inspire public trust, and encourage ongoing participation in management efforts across the Kaibab National Forest.

Background

Previous collaborative work on landscape-level planning set the context for the Kaibab Forest Health Focus. A series of efforts over the past seven years provided input and helped set objectives for this effort. This background involves numerous nested efforts and outcomes that are difficult to tease apart, as each built upon a body of previous work, yet deviated from them in important ways, based on "lessons learned" by the collective groups of participants. Perhaps chief among these lessons was the role of science in supporting the collaborative process. Used appropriately, science can inform the process and elevate deliberation, rather than constraining collaboration or worse yet, dictating outcomes. By drawing on experiences in science-based collaboration, participants were able to make rapid progress, drawing upon outcomes from several seminal efforts that included work by various agencies, conservation organizations, researchers, and individuals, many of whom contributed to three collaborative assessments of particular relevance to the Focus.

1. *Western Mogollon Plateau Adaptive Landscape Assessment (WMPALA)* - Participants prioritized lands within 2 million acre study area, working in four independent break-out groups. By addressing the same problem in parallel, they demonstrated a high level of congruence indicating that the level of agreement emerging from collaboration was considerably higher than most observers anticipate. The effort also pioneered techniques for GIS-based participatory analysis that combined diverse data in ways that illustrated values, threats to those values, and management actions that might be taken to alleviate threats to high priority landscape features. Similar results were obtained through subsequent efforts in the White Mountains of Arizona and in north-central New Mexico, validating the approach. While collaboration does not generally lead to 100% agreement on all issues, it can identify broad swaths of large landscapes across which informed stakeholders agree that restoration-based forest treatments should move forward.

2. *Statewide Strategy for Restoring Arizona's Forests* – An effort of the Governor's Forest Health Advisory Council, the Statewide Strategy comprises agreed-upon priorities and recommendations for each of seven forested landscapes in Arizona. The Kaibab National Forest includes parts of two of these landscapes, and recommendations that are relevant to the Kaibab Forest Health Focus include, but are not limited to, the following:

    Prioritizing forest treatments to maximize efficiency and return on investment; building appropriately scaled economic capacity to accelerate treatment implementation; collaborative engaging collaborators in the articulation of spatially and temporally explicit long-term restoration and fire management plans that support the reintroduction of natural fire; coordinating cross-jurisdictional forest restoration and fire management plans; identifying fire management and forest restoration strategies that protect and restore wildlife habitats and connectivity.

These and other recommendations provide a mandate for action emanating from the community, county, and state levels in Arizona, and a desire to work cooperatively with federal land managers to implement ambitious forest restoration and conservation efforts across the state, including the area under jurisdiction of the Kaibab National Forest. The deliberative effort of the Arizona Governor's Forest Health Councils helped guide all phases of the Kaibab Forest Health Focus.

3. *Analysis of Small-Diameter Wood Supply in Northern Arizona* - This project focused on identifying the wood volume that might be made commercially available through the implementation of a comprehensive restoration plan covering 2.4 million ac, including the Williams and Tusayan Districts of the Kaibab National Forest. Using advanced techniques for spatial analysis, estimates were divided into three size classes based on diameter: < 5", 5-16", and >16". No explicit "diameter cap" was used in this analysis, but examining wood supply by size classes allowed the group to address concerns about large tree retention and harvest. Overall, agreements regarding "supply" were predicated upon an agreement that no harvest would go forward that was not in accordance with the broader societal goals of forest restoration, fire management, wildlife conservation, and other values. The wood supply analysis demonstrated strong and broad social agreement regarding perhaps the most controversial aspect of forest management in the Southwest: the nature and appropriate level of tree harvest that could be expected under a paradigm of restoration of fire-adapted forest ecosystems. Because the objective of this

project was to estimate the volume of wood available through broadly agreed-upon forest treatments, it did not specify the locations where particular treatments should be carried out. Thus, there is a need for detailed efforts to "drill down" at higher resolution in sub-regions of the assessment area to identify appropriate treatments and inform project-level planning. The Kaibab Forest Heath Focus is one such effort that has the potential of "scaling down" these previous agreements to much smaller areas on three National Forest districts, for the purpose of guiding detailed analysis and site specific planning..

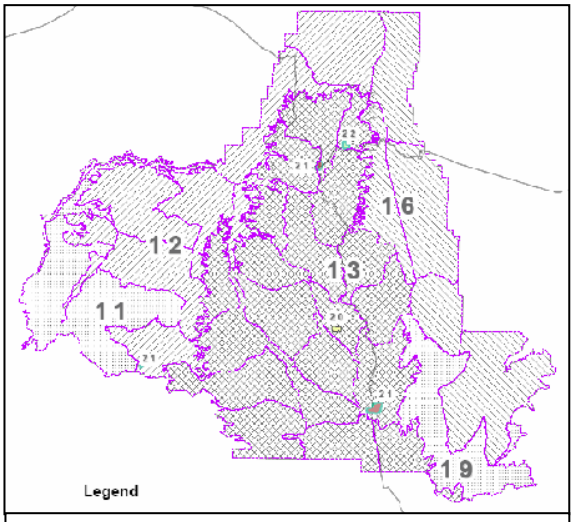


Figure 1. Sample map of landscape subdivisions on the Kaibab National Forest, from the current Forest Plan. Such maps served as a starting point for the collaborative group's assessment of priorities.

Study Area

The original analysis area for the Kaibab Forest Health Focus (KFHF) was suggested based on a map of Kaibab National Forest landscapes, as articulated in the current Forest Plan (Figure 1). These landscape units were developed by KNF, based on vegetation type and elevation that allowed staff to subdivide the forest for planning purposes. From this subdivision of landscapes, we selected the areas defined by the KNF as encompassing ponderosa pine and mixed conifer forest types. Although these individual landscapes were not ultimately adopted by the stakeholders as the most appropriate divisions for the Focus process to address prioritization and develop treatment guidance, the KNF landscapes did provide the outer boundary of the analysis area. In order to capture neighborhood influences and minimize the artificial effects of boundaries on the analysis, this area was then buffered by five miles to provide sufficient landscape context as the collaborative group progressed through the analysis and mapping process.

Approach & Methods

Our approach was modified from larger and more complex landscape assessment efforts undertaken by the ForestERA Project and collaborators in the *Western Mogollon Plateau Adaptive Landscape Assessment*, and through the *Northern Arizona Small-diameter Wood Supply Analysis*. However, this effort differed in that the objective of the group was to address

practical problems of forest planning and management, such that the data and outcomes could be seamlessly incorporated by the forest staff in their subsequent work, thereby preserving the outcomes of focused public involvement at the earliest, pre-proposal stages of the planning process. This work provided broad public engagement on key issues, and considerable efforts were made to ensure that the outcomes had a high degree of support within the group.

The Focus effort involved the gathering of existing spatial data, data integration, and efficient analysis driven by the collaborative. Scientific efforts were complemented by the convening of a collaborative group to discuss and negotiate appropriate approaches to prioritization and treatment, and the scientific and technical support of this group allowed participants to explore diverse public values and articulate desired outcomes. The approach sought to build consensus on top priorities and treatment guidance, while identifying with increased specificity areas and treatments where agreement proved difficult to forge.

The four Focus workshops, held with stakeholders and scientists, were conducted with a facilitator and the use of participatory GIS. Invited participants represented a range of interests, including environmental groups, forest industry representatives, local tribes, community organizations, academics, and state and federal wildlife agencies. A larger group of observers was also invited to attend and offer input at specific times during the workshops, and the meetings were supported by ForestERA scientists, a spatial analyst, and a facilitator. The meetings were also advertised to the larger public. A total of 30 individuals representing 18 groups participated in the Focus (see Appendix 3). Many of these individuals or the organizations they represented had participated in one or more of the previous efforts, noted above. In addition to the four scheduled, large-group workshops, we also conducted three supplemental meetings, at the request of the participants: one technical data orientation meeting and two independent small-group breakout meetings. These meetings were structured by the participants, with a small set of stakeholders tackling in detail some key issues for which there was insufficient time during the larger meetings. These efforts were essential to reaching agreement on priorities and management guidance on all districts

The interactive, map-based approach for engaging participants in landscape assessment and analysis provided an avenue for visualizing, discussing, and, when necessary, revising provisional outputs from the Focus. The Focus meetings provided an opportunity for deep exploration of forest conditions and involved deliberation among the stakeholders regarding the often contentious issues of mechanical thinning, prescribed fire, and wildlife habitat, among others. Science-based deliberation allowed the participants to increase understanding and pursue clarity and consensus in areas of initial disagreement.

Throughout the collaborative process and particularly in its conclusion the facilitator was careful to quantify the level of agreement within the group. For the KFHF we were striving to reveal the strong areas of consensus as well as areas of disagreement. Gauging the participant's level of consensus for the group's decisions and guidance was evaluated by assessing "Four Levels of Support" at key decision points in the process and on final products given the level of information at that time. Participants received instructions that "*consensus is when everyone can live with or agree to support the decision—not that it is the "very best" decision for everyone. You should not feel as though your fundamental interests have been compromised*". Final recommendations on priorities and treatment guidance for each district and priority area were assessed with the following rubric:

Level of support	
Participant Decision	*Group Action*
1. I can easily support the action.	Move forward with consensus
2. I can support it but it may not be a preference	Move forward with consensus
3. I can support the action if minor changes are made.	Try to get concrete minor change & if acceptable, conclude consensus
4. I cannot support it unless major changes are made.	If these (4's) cannot be resolved with concrete proposal, then there will be an opportunity for a minority report

Additional clarifying group instructions were given as follows:

1. If all participants expressed level one or two support than we conclude consensus and "unanimity"—with one spirit.
2. Any threes and fours we will try to address and resolve.
3. Strive for identifying any 4's and if we have no 4's we can conclude consensus.
4. If we are unable to resolve any 4's then those participants will have the opportunity to write an alternative interpretation. We are striving to reveal the strong areas of consensus as well as areas of disagreement.

The original intent of the Focus was to employ methods and build on the approach and results from WMPALA, completed in 2004, updating that information where necessary and extending that methodology to the Tusayan and North Kaibab Ranger districts. In previous collaborative efforts, stakeholders had articulated their values regarding landscape features or

characteristics, and then identified perceived risks to those values. Once that was accomplished, the ForestERA group was able to represent these values and risks spatially, weight and rank them according to the participants' input, and overlay the values and the risks to show continuous priorities (ranked on a high-low scale) across the landscape. In the KFHF process, this approach was scaled down by two orders of magnitude, from millions of acres to tens of thousands. At this scale, stakeholders were much more familiar with specific places and current conditions on the landscape. Because of this sense of familiarity and detailed knowledge, stakeholders preferred to identify specific places and areas that they considered as priorities, such as specific mountain slopes or communities with a unique wildland/urban interface, rather than approaching prioritization exclusively from the values-and-risks approach used in previous landscape assessments. In addition stakeholders considered their site-specific knowledge when assessing threats of undesirable crown fire. Given this approach, the three ranger districts were examined distinctly and independently, requiring two unique analyses for each district, one for prioritization and another for treatment guidance, resulting in the six analyses presented below. The Focus prioritization went through three map revisions, and commentary on the process and results are presented alongside the maps in the Results section of this report. Similarly, the analyses underlying treatment guidance went through several revisions and the nature of the resulting recommendations differ among the three districts. Details for each are presented with the associated treatment guidance maps.

Results

Like most collaborative efforts, the Kaibab Forest Health Focus continued to change and evolve throughout the project period. Many issues, in addition to those related to the purposes and objectives outlined above, were addressed, and the initial pathway through analysis and interpretation was superseded by new approaches and perspectives that emerged from the work of the collaborative. This progression ushers in the true power of collaboration, where insight emerges from deep consideration of diverse values, and deliberation leads to sequential refinement of outcomes, along with increased levels of agreement within the group.

The outcomes from the Focus process are presented here in several forms. First, on a district-by-district basis, maps identifying priority areas are presented, accompanied by tables quantifying the areas of the emerging priorities. A similar set of maps is provided for treatment guidance, with each of the priority area polygons receiving a particular set of guidance. Finally, we present brief textual treatments of the outcomes of discussion of other issues relevant to the management of the Kaibab National Forest. The text attempts to capture the nature of the group deliberations on a series of issues that could not be explicitly incorporated into spatial analyses, for a variety of reasons. This should not be interpreted as suggesting that these issues are less important than the factors incorporated into detailed analysis, but rather their text-only treatment indicates that they are either less relevant to the prioritization and treatment guidance foci of this project, or that there was insufficient information available for such detailed analysis. In an effort to capture the diverse views and maintain the transparency built through the collaborative process, this report was distributed for review with resulting comments addressed and integrated through several informal and one formal revision. At the final meeting of the Kaibab Forest Health Focus, the collaborative group reached consensus (as determined by an evaluation of a 1 or 2 rating of support outlined above) regarding the identification of priority areas and treatment guidance, with one exception. On the Williams District, participants indicated a desire to see results from a revised analysis, and read the accompanying text, prior to identifying the level of agreement regarding treatment guidance. That analysis was completed and incorporated into the draft report, which was distributed to the participants on 10August2009. Solicitation of comments resulted in several suggestions, which were incorporated into the results displayed below. We believe that agreement was generally high for these outcomes, however, explicit determination of the level of support for this guidance was not possible."

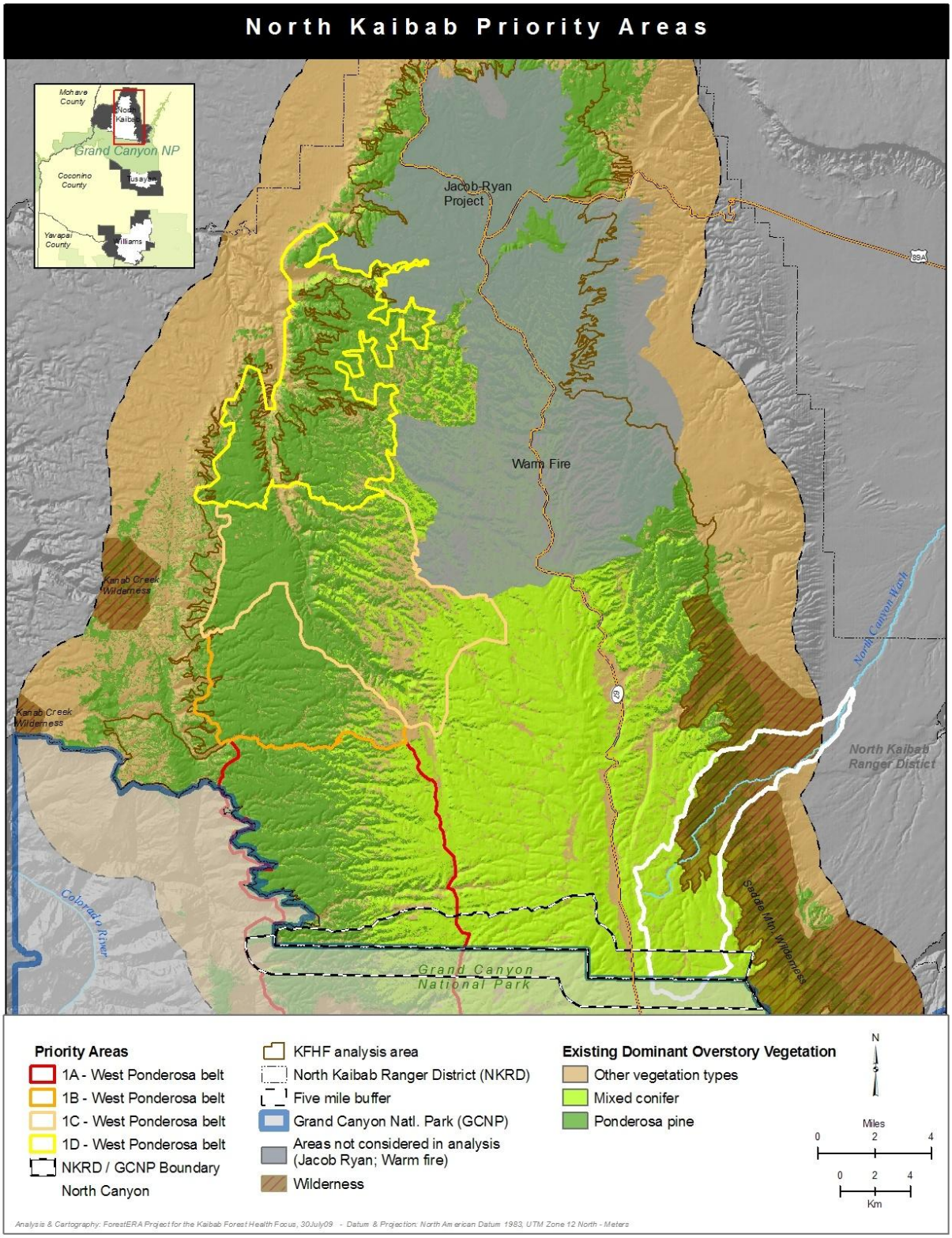
Collectively, these results present a spatially explicit and detailed account of an iterative, collaborative, and practical effort to bring strong science and detailed and diverse public

engagement together to help guide the work of the Kaibab National Forest staff in charting a new approach to forest management that engages stakeholders – another word for the engaged public – early and deeply in planning process. These results will inform planning processes over the coming years, and the data and analytical results will be available for inclusion in future environmental analyses. Additional information on these outcomes is available from the Kaibab National Forest and the ForestERA Project at Northern Arizona University.

Table 1. Results from prioritization efforts, Kaibab Forest Health Focus			
District	**Area**	**Subarea**	**Acres**
North Kaibab			
	North Canyon	Above Rim	6,508
		Below Rim	8,658
	subtotal		*15,164*
	Western Ponderosa Belt	1A	45,595
		1B	15,180
		1C	29,046
		1D	25,228
	subtotal		*115,049*
	Boundary Zone	NKRD	11,959
		GCNP	12,111
	subtotal		*24,070*
	Minus areas of overlap*		10,807
	District total†		**143,476**
Tusayan	Coconino Rim		3538
	West Tusayan		11,176
	East Tusayan		15,950
	District total		**30,666**
Williams	Community Protect. Zone		25,342
	Mountain Slopes		26,475
	Sycamore Canyon	A	10,060
		B	13,072
		C	10,551
		D	17,225
	subtotal		*50,910*
	District total‡		**102,726**
*Priority areas overlap; see prioritization overlap table below.			
†District total includes 31,831 acres located outside the analysis area.			
‡District total includes 6,858 acres located outside the analysis area.			

Table 2. Overlap among priority areas identified in the Kaibab Forest Health Focus			
District	Area	Subarea	Acres
North Kaibab			
	Boundary Zone/North Canyon ***Overlap***	NKRD/GCNP	2,237
	Western Ponderosa		115,049
	Boundary Zone/West Ponderosa ***Overlap***	NKRD/West Ponderosa	3,693
	Boundary Zone/West Ponderosa ***Overlap***	GCNP/West Ponderosa	4,877
		subtotal	*8,570*

North Kaibab Ranger District



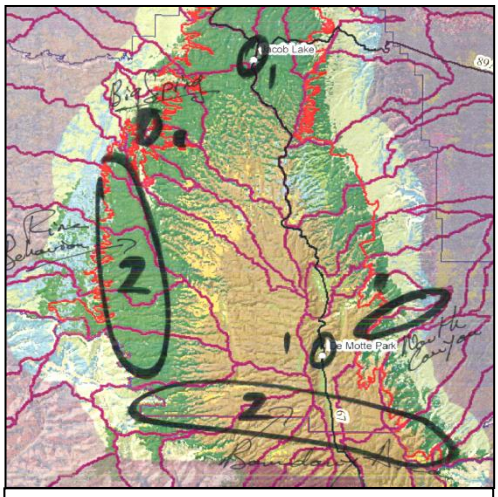
A. Landscape Prioritization

The collaborative identified two areas of high priority for restoration treatments, and one area of opportunity for cross-jurisdictional restoration efforts, for the North Kaibab Ranger District. There was some overlap in these areas, despite the fact that each emerged as a priority for different reasons. For practicality, the large belt of ponderosa pine forest on the west side of the Kaibab Plateau was broken down into five subareas, and the North Canyon watershed in the southeastern portion of the study area was divided into two. These eight resulting priority areas were not explicitly ranked, though there was consensus that restoration treatments in the western ponderosa pine belt should begin at the southern end, in consideration of prevailing winds during the fire season.

Approach and outcomes

Initially, human infrastructure and community protection criteria were used to identify the highest priority areas for ecological restoration. However, further analysis showed that these areas, including DeMotte Park, Jacob Lake, and Big Springs were either already identified for fuels reduction treatments or fell outside the analysis area.

The ponderosa pine belt along the western side of the Kaibab Plateau was identified as a priority area following inspection of forest composition and fire behavior data. The group felt the entire area should be considered as one unit for planning purposes, however, this large area was subsequently broken into five units of appropriate size for more detailed analysis and project planning. The western edge of these units corresponds to the ecotone between ponderosa pine forest from pinyon-juniper woodland, while the eastern edge was located in the broader, more heterogeneous pine/mixed confer transition. There was a desire from some members of the group to identify the entire western belt as high priority, but the group consensus was that only ponderosa pine stands within this belt should be the targets of restoration treatments (see below). Among the five sub-areas that comprise the western ponderosa pine belt, the southernmost unit (1A on facing map) was identified for earliest management attention, because prevailing winds during the fire season are typically from southwest, and would tend to push fires to the northeast. Thus, restoration treatments in the southern portion of the pine belt may convey some protection to the more northerly



Early efforts to map management priorities were based on human infrastructure, forest structure, and fire hazard. These were modified during group deliberation, as shown in black, eventually resulting in the priority map on the facing page.

subareas. In general, it was felt that progressing with treatments from south to north would be appropriate.

North Canyon was identified as a priority area for management attention because of its springs, permanent stream, riparian habitats and its population of the endangered Apache trout. This area was defined by the 6th level HUC boundary, intersected with the 2,625-m elevation contour to approximate the canyon rim. The portion of North Canyon below the rim falls within the Saddle Mountain Wilderness, and this portion of North Canyon falls outside the Focus analysis area. North Canyon was a contentious area for some participants. Concern was expressed over identifying the entire North Canyon watershed as a priority area when only the portion above the rim was considered by the group when developing treatment guidance. This discussion highlighted the distinction between areas of high value and areas of high priority for restoration treatments. There was consensus that all of the North Canyon watershed, both above and below the rim, is an area of high value, but many participants felt that only the area above the rim, in mixed conifer forest, was an appropriate target for restoration treatments; active treatments below the rim, within designated wilderness, would be both highly contentious and expensive. Therefore, while the larger North Canyon area is depicted as a priority area as an area of high value (with upper and lower elevation subareas clearly identified), only the higher elevation (southern) portion of the North Canyon watershed was identified as a high priority for treatment. As is indicated in the next section of this report, uncertainty regarding appropriate treatments for mixed conifer forests is high, and the overlap in jurisdiction between the KNF and Grand Canyon National park make this a challenging priority area that presents unique opportunities for collaboration and adaptive management.

The boundary area between the North Kaibab Ranger District and Grand Canyon National Park (blue) was considered a unique feature, due to historical differences in forest management and the resulting contrast in forest conditions across this administrative boundary. The collaborative felt that this situation presented an opportunity for pursuing cross-boundary, interagency approaches to forest restoration that could provide for continuous forest, fire, and wildlife management of this area. Similarly, the southern portion of the western ponderosa pine belt encompasses both Forest Service and National Park Service lands, and this subarea (Pine Belt 1A) overlaps the western portion of the Boundary zone priority area. The group discussed this and decided to display this overlap to express the logic behind the selection of each area, and because areas of overlap may indicate elevated priority. However, no clear relative ranking among these priority areas emerged from the group. Each priority area was considered important for the reasons articulated above.

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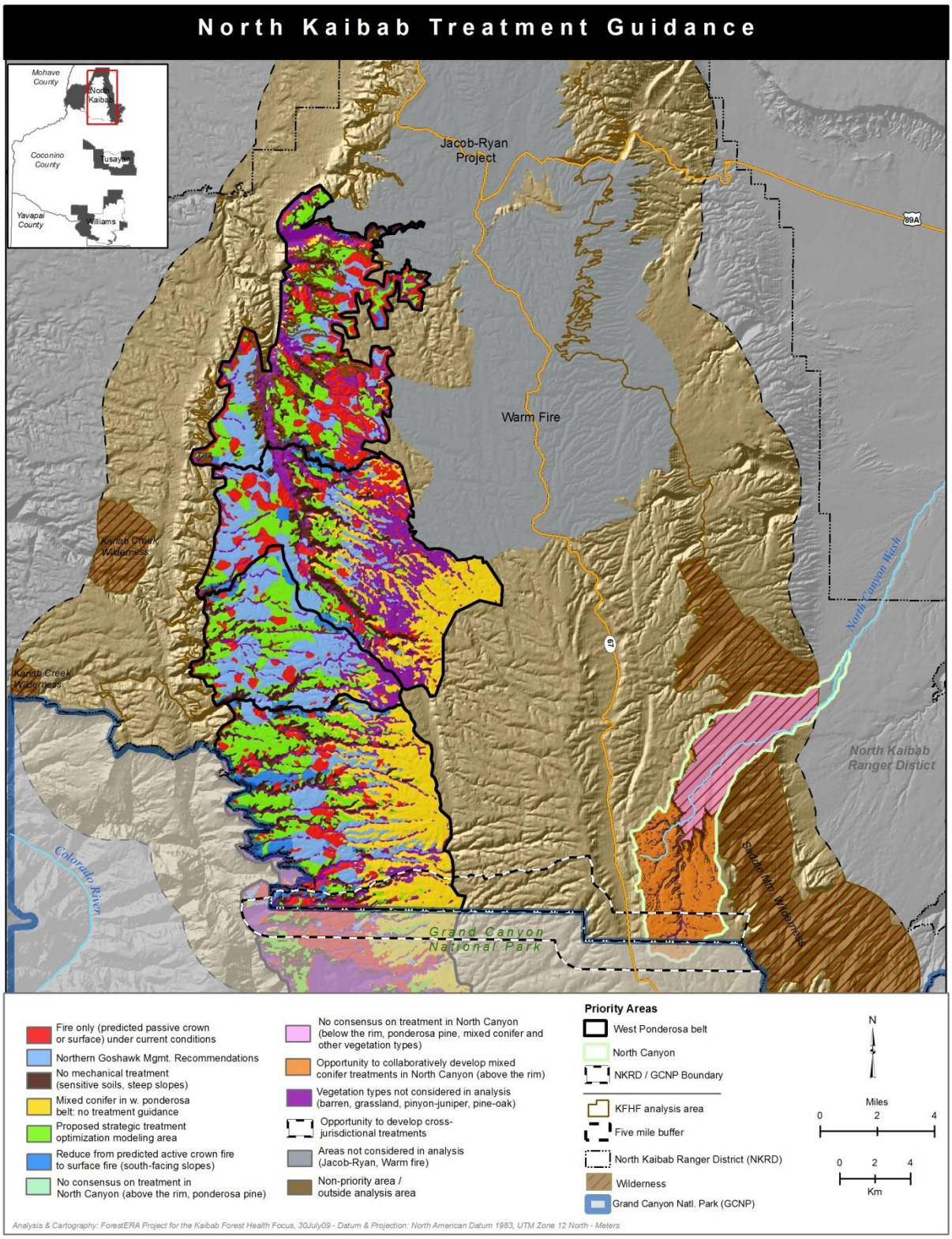
2. North Kaibab Ranger District



B. Treatment Guidance

Western ponderosa pine belt The collaborative viewed this ponderosa pine portion of the North Kaibab Ranger District as a single priority area that should receive a configuration of treatments that most efficiently meet ecological restoration goals, including the return of natural fire regimes. In addition to these explicit overarching goals, the group expressed an interest in moving toward a forest structure in the pine type that favors the groups or "clumps" of multi-storied, uneven aged stands. The group recognized that the five sub-units comprising this large priority area represent a significant management challenge, and that conditions are sufficiently variable that detailed guidance would quickly reach the level of specificity required for project-level planning, which was not the group's objective. Therefore, the group recommended several broad approaches, to be refined in future planning efforts. First, the large portion of this landscape that falls within northern goshawk (*Accipiter gentilis*) habitat and should be treated following the Kaibab National Forest Plan standards and guidelines for n. goshawk habitats. South-facing areas with one-half mile of selected existing roads (KNF road classes 3, 4, and 5) should be treated in a manner sufficient to reduce fire behavior to passive ground fire, according to the ForestERA maps of fire behavior (note: based on scientific presentation, data exploration, and group discussion, the collaborative group recognized that these models are imperfect and cannot necessarily predict actual fire behavior, but they do serve as a useful guide to the relative fire hazard across the landscape, and they provide helpful guidance for identifying areas most in need of management attention). The use of road buffers was intended to provide anchor points for restoration treatments. Areas predicted to show passive crown fire or surface fire were identified for fire-only treatments. The group recommended that treatments in the remaining areas of predicted active crown fire in ponderosa pine forest be located according to an optimization approach (such as that developed by Mark Finney (Finney, M.A., 2007) and colleagues at the Fire Science Laboratory, Missoula, MT) such that multiple small treatments be located in a manner that would convey the greatest benefit across the larger landscape. Treatment optimization has the potential to reduce crown fire spread rates and permit more extensive use of prescribed fire and Wildland Fire Use fire, both within and outside areas that have been previously mechanically thinned). Planning for treatment optimization at landscape scales will require additional analysis and spatial modeling. The group suggested that the use of optimization modeling, here and on the other districts, should be executed with caution and with high levels of transparency, employing sensitivity analysis and exploring predicted effects, prior to project-level planning.

Steep slopes and sensitive soils, and all vegetation types other than ponderosa pine and mixed conifer were removed from consideration for restoration treatments (due to the scope of the Kaibab Forest Health Focus), however, because these areas are also biologically important, they will be incorporated into project planning efforts as the recommendations of this report inform future planning and on-the-ground restoration efforts. The ecotone area between ponderosa pine and mixed conifer was an area of interest for many members of the group. Proponents of treatment in this area suggested that it could reduce the likelihood that fires would spread into the thicker mixed conifer stands. However, the group elected not to include these transitional zones in the treatment guidance for this priority area due to the lack of a clear definition of the ecotone and uncertainty regarding appropriate treatments for mixed conifer forest types. While the treatment guidance provided was specific to ponderosa pine, participants agreed that the mixed conifer stands in the area deserved additional attention because of high fuel loads and the current inability to identify appropriate treatment guidance should not be interpreted as a low of priority, but rather as a call for an in-depth effort to address restoration of mixed conifer stands across the Kaibab National Forest (see below). One such consideration mentioned by some of the group is to design appropriate treatments in mixed conifer to be consistent with the Mexican spotted owl recovery plan.

North Canyon Watershed Treatment guidance for this priority area is limited to the forested portion of the watershed above the rim; no treatments were considered for the canyon portion which contains one of the Kaibab National Forest's few permanent streams. Guidance in the upper watershed, comprised almost entirely of mixed conifer forest, is also minimal, due to the above-mentioned lack of consensus regarding appropriate restoration treatments in this forest type. The collaborative felt that this lack of consensus was a significant regional issue and that a concerted effort to address restoration treatments in mixed conifer was needed. However, such an effort was deemed to be beyond the scope of the Kaibab Forest Health Focus. Due to the high resource value of the lower watershed, and its vulnerability to crown fire in the upper reaches, the group felt that the upper portion of North Canyon was an appropriate location for pursuing an adaptive approach to identifying appropriate treatments for mixed conifer forest.

Such an effort would employ an experimental approach, where alternative treatments – designed with involvement of experienced ecologists and forest managers – would be implemented and monitored for effectiveness, and impacts on a range of resources would be quantified as well as being consistent with Mexican spotted owl guidelines.. These results, in turn, would feed back into the design process, with future phases of experimentation generating

an increasingly informed approach to restoration of mixed conifer stands. As a starting point, Focus participants suggested that work on mixed conifer treatments might engage regional experts in a collaborative approach that built on previous work of the collaborative, including but not limited to critical habitat and recovery plan considerations for Mexican spotted owl, efforts to reduce crown-fire potential, retention of large trees, minimization of post-fire erosion and sediment impacts on Apache trout, protection of water features, and a precautionary approach emphasizing opportunities for collaborative planning, research, and monitoring. In support of these ideas, the Kaibab National Forest has supported preliminary analyses conducted by ForestERA to evaluate mixed conifer forest conditions on the North Kaibab Ranger District. Forest inventory data from 1909 and 1990 were compared to estimate historical differences in mixed conifer tree species composition and structure in addition to forest differences across principle biophysical gradients.

Forest Service/Park Service Boundary Area No explicit forest restoration treatment guidance is given for this area, other than the zone where it overlaps with the West-side ponderosa pine belt, because it encompasses primarily mixed conifer forest types for which there is, at present, little agreement on appropriate treatment prescriptions. The group suggested that whatever management approach is adopted for this area, planning for treatment should employ an adaptive framework, as described above, and all efforts should be made to coordinate with Grand Canyon National Park (GCNP) to provide for continuous management across the park/forest boundary. However, treatments on US Forest Service lands in this priority area should not be contingent on the cross-boundary coordination with the GCNP.

Table 3. Treatment guidance and area, by treatment type, North Kaibab Ranger District.

Landscape Unit	Guidance	Acres
North Kaibab RD	Follow Forest Plan standards and guidelines for goshawk habitat	17,257
	Treat to reduce from predicted active crown fire to surface fire (south facing roads)	2,979
	Proposed strategic treatment optimization modeling	19,051
	No mechanical treatment (steep slopes, sensitive soils)	14,034
	Fire only in predicted passive crown fire or surface fire under current conditions	17,988
	No consensus on treatment in mixed conifer	14,127
	NPS/USFS -None - area to focus cross-jurisdictional coordination of forest treatments	24,063
	Opportunity to collaboratively develop mixed conifer treatments in North Canyon (above the rim)	6,793
	No consensus on treatment in North Canyon (above the rim, ponderosa pine)	100
	No consensus on treatment in North Canyon (below the rim, ponderosa pine, mixed conifer and other vegetation types)	6,506
	Vegetation types not considered in analysis (barren, grassland, pinyon-juniper, pine-oak, riparian)	24,538

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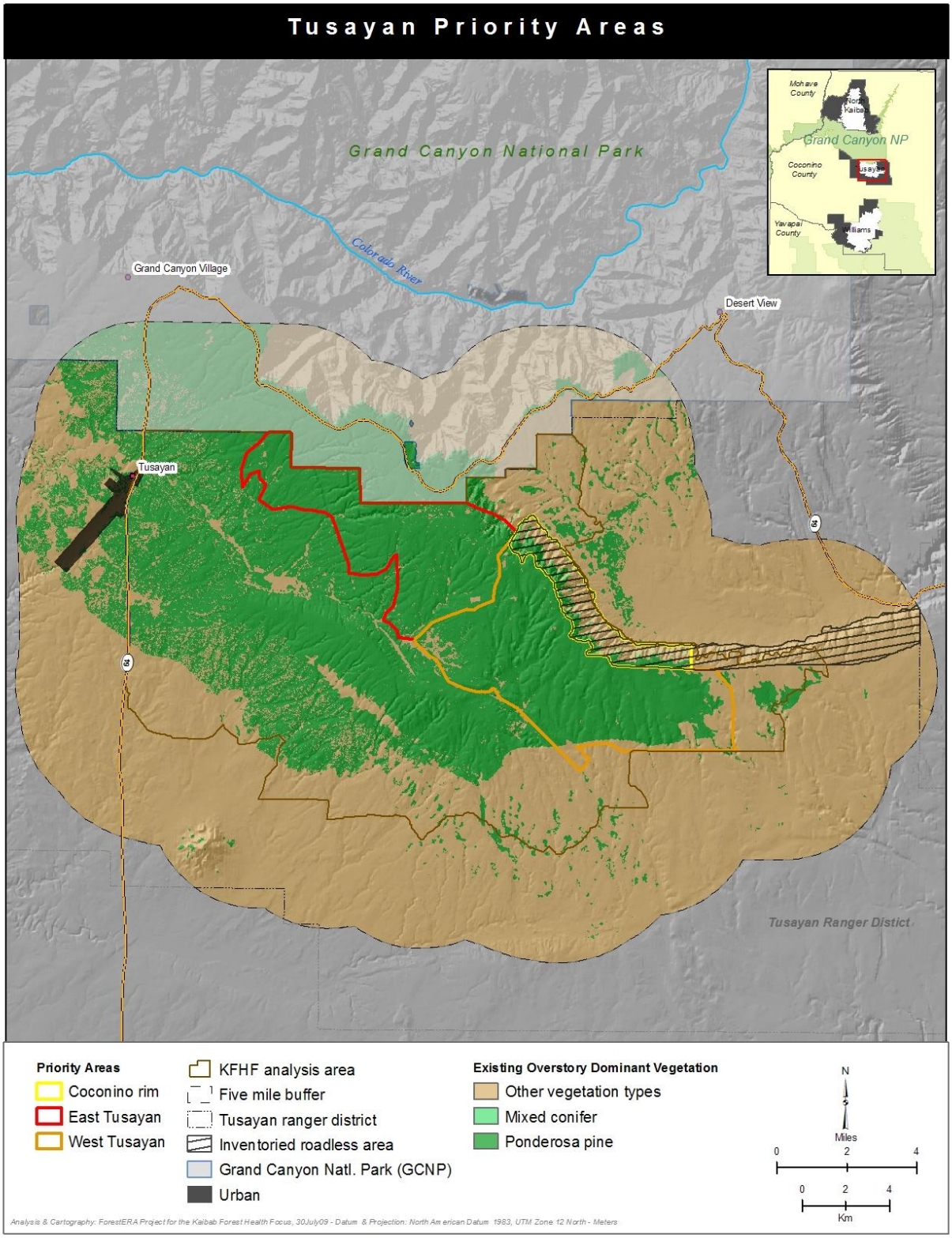
Tusayan Ranger District

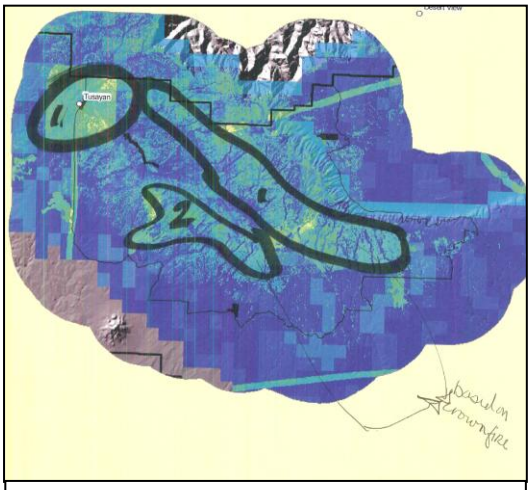


A. Landscape Prioritization

The Tusayan Ranger District was deemed to be the least complicated of the Kaibab National Forest's three districts. Three priority areas emerged from the collaborative process, based on active crown fire behavior, topography, road access and proximity to Grand Canyon National Park and sensitive plant populations on the Park's South Rim.

Approach and Outcomes

The majority of the Tusayan district is relatively flat, at mid-elevations, and supports stands of ponderosa pine forest. This large area is relatively homogeneous, and the group was challenged to develop a means of prioritizing specific areas within the district. According to fire staff of KNF, much of the area has been subject to thinning projects and prescribed fire, leaving the area in a condition where it can be treated in the future largely with prescribed fire. Small areas currently undergoing NEPA analysis include the Tusayan urban area and surrounding developments, and these areas were excluded from the East and West Tusayan priority areas because treatments are already planned or completed. The priority areas depicted in the map were identified based on ForestERA's aggregated active crown fire behavior models, and they extend approximately 15 miles east to west and from 1-4 miles from the southern boundary of Grand Canyon National Park, to the north. This larger area was subdivided into two smaller priority units, based on USFS roads, but the group believed this area provided an opportunity for the USFS to attempt larger-scale NEPA planning efforts and, thus should be planned for as one unit. Stakeholders felt roads were the smartest way to delineate boundaries in this case, due to their role in managing fire, ability to be clearly identified in the field, as well as providing access for restoration activities.



Initial mapping of priorities on the Tusayan used approaches from the 2002 WMPALA effort to construct a continuous model of values, as expressed in the collaborative process. This approach, illustrated in the map above, was eventually replaced by a stakeholder mapping approach described in the Methods section. Both approaches identified the Coconino Rim as a priority area (see final map).

The Coconino Rim area was identified as a third priority area for the Tusayan district. Participants felt this area was topographically and vegetatively distinct, and presented challenges of access that would limit management options. Most of this area is in an inventoried

roadless area, and the majority of the area has is slopes of greater than 40 percent. It is dominated by ponderosa pine at the upper edges of the rim, with pinyon pine at the mid-slopes and lower elevations. The Coconino Rim priority area pertains only to the ponderosa pine type. Stakeholders provided relative rankings of these priority areas, with the western polygon ranking highest, followed by the eastern polygon, and the Coconino Rim identified as the third-highest priority on the District.

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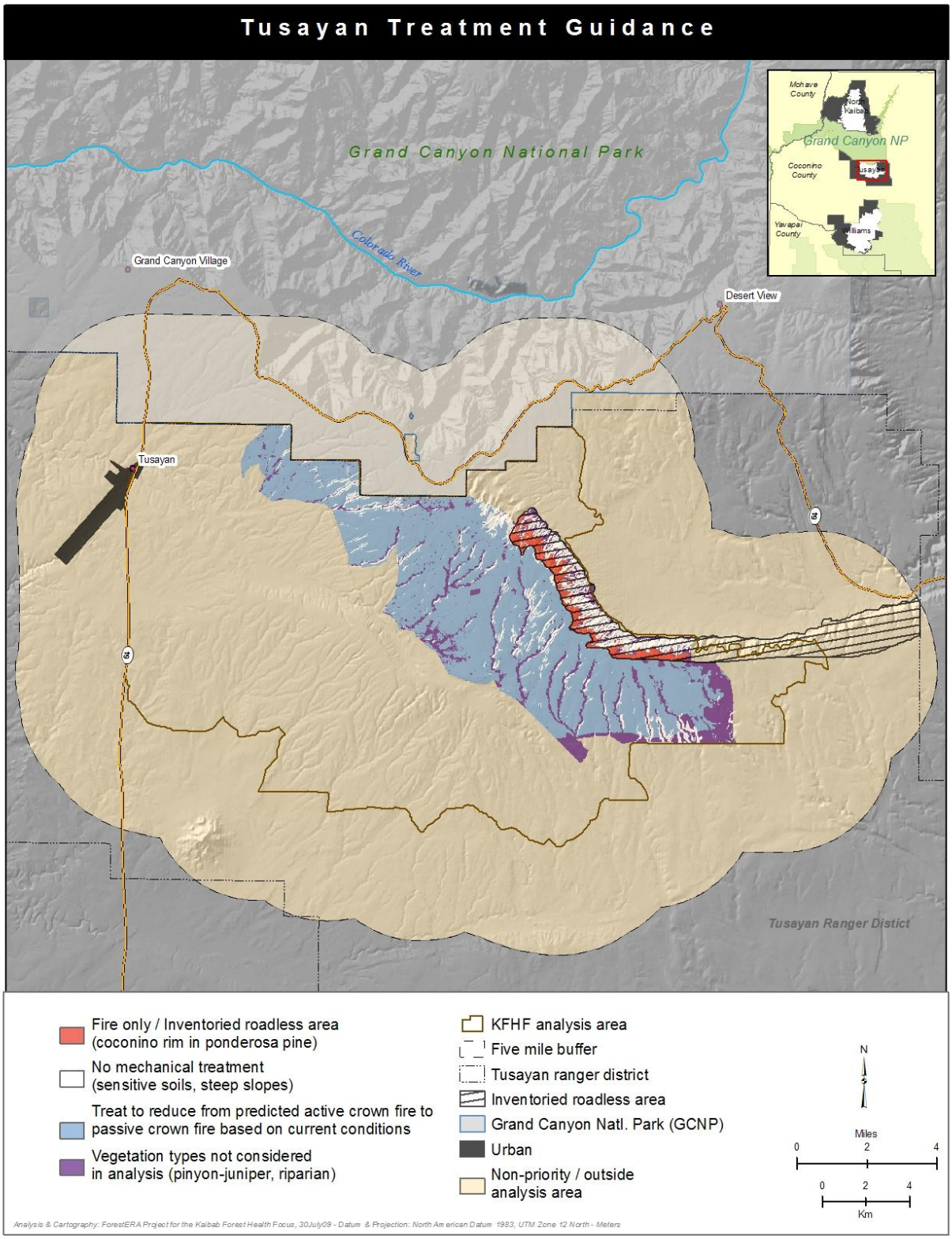
2. Tusayan Ranger District



B. Treatment Guidance

East and West Tusayan Treatment guidance for the Tusayan district is relatively simple and straightforward. The group recommended treating the East and West Tusayan areas to reduce areas of predicted active crown fire to predicted surface/passive crown fire. Here, as in other priority areas across all three districts, this intent of this treatment guidance is to move the area towards a desired post-treatment condition that could support surface fire and provide for "groupy, clumpy, multi-storied and uneven-aged" forest structure. The group believed that this could be accomplished largely with prescribed fire, although mechanical thinning may be necessary in some areas, particularly where there is concern for sensitive wildlife habitats and human infrastructure. This area might provide a valuable opportunity for optimization modeling subject to the caveats mentioned in the discussion of the N. Kaibab. Only areas of ponderosa pine forest were recommended for treatment.

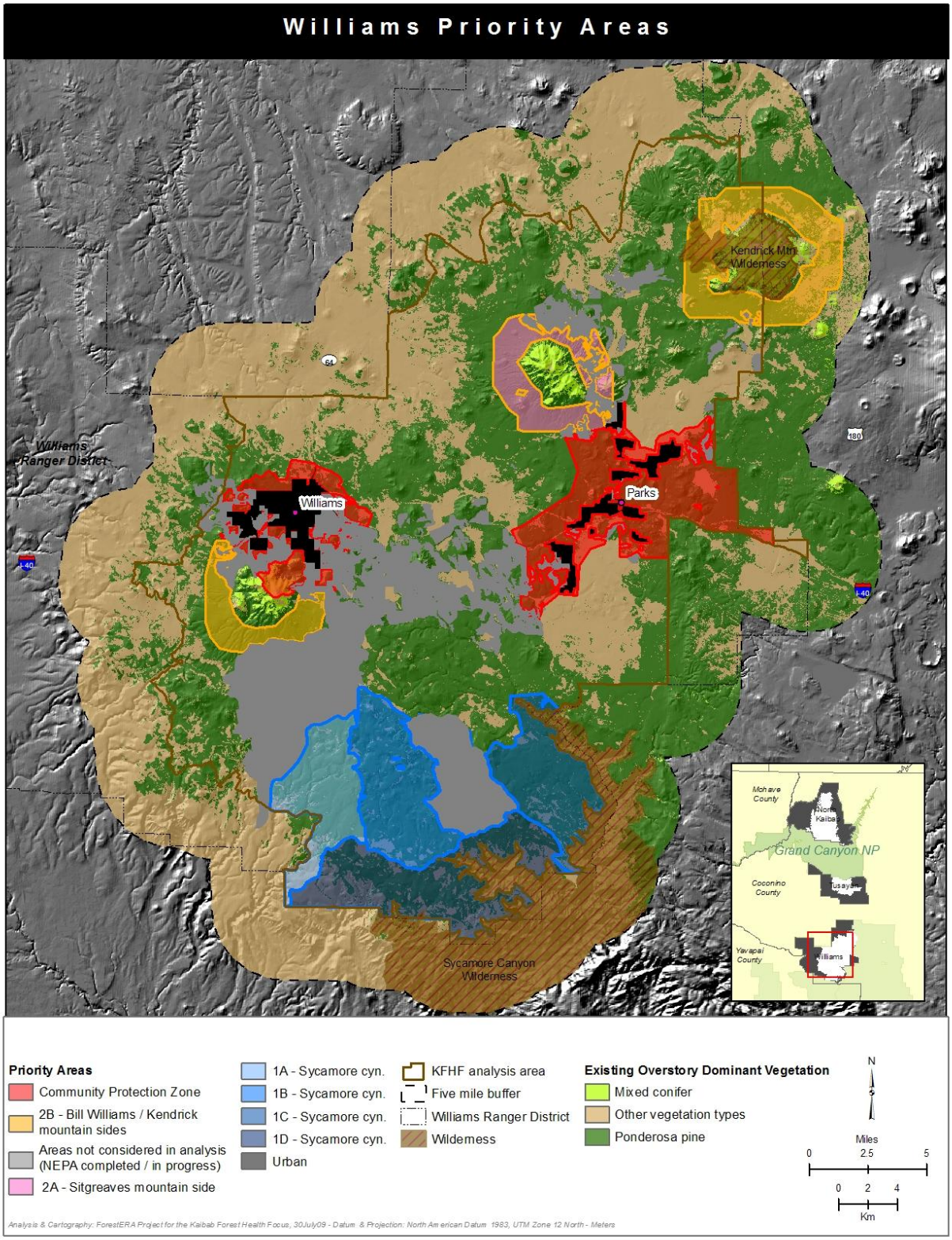
Coconino Rim Guidance for this priority area specified fire-only treatments, due to its rough and broken topography, as well as its status as a roadless area. The group recommended the development of a Wildland Fire Use plan in this area in recognition of its unique conditions. As with the two prior Tusayan priority areas, this guidance applies only to the ponderosa pine type. Areas of steep slopes, sensitive soils and other vegetation types were removed from consideration for treatment.

Table 4. Treatment guidance and amount of area by treatment type, Tusayan.

Landscape Unit	Guidance	Acres
Tusayan RD	Fire Only / Inventoried Roadless area (Coconino Rim in ponderosa pine)	1,156
	No Mechanical Treatment (steep slopes, sensitive soils)	3,778
	Treat to reduce from predicted active crown fire to passive \ surface fire based on current conditions (east and west Tusayan)	21,372
	Vegetation types not considered in analysis (pinyon-juniper, riparian*)	4,359

*Vegetation data were derived from LANDFIRE, riparian areas are known to be over predicted in these southwestern forests. See data development section for more information.

Williams Ranger District



A. Landscape Prioritization

The Williams District presented particular challenges to the Focus, due to many large, ongoing projects in various stages of NEPA analysis and implementation. Work in the early Focus meetings produced initial prioritization results that later required revision when it was discovered that they overlapped with areas that were already planned and/or recently treated. Subsequent efforts to integrate Forest Service NEPA planning and management maps with spatial data depicting land ownership and biophysical data resulted in a more insightful analysis that drew on expert knowledge and the high degree of familiarity with this area that emerged from the WMPALA project, as well as from the personal experience of Focus participants, several of whom lived and worked within this study area. Iterative refinements of the Williams analysis led to the identification of several distinct high-priority areas.

Approach and Outcomes

The Williams community protection zone was developed around the two largest communities in the Williams Ranger District: the City of Williams and the unincorporated community of Parks. Stakeholders chose to buffer the City of Williams with a slightly modified 6th level HUC that represents the municipal watershed. A minor edit removed the HUC extension north of Williams. Extension of the municipal watershed onto the northwest side of Bill Williams Mountain caused some concern, but was superseded by treatment guidance keyed to vegetation type (see below). The Parks area was hand drawn by stakeholders to encompass all of the private lands in and around the community of Parks, as represented in the KNF landownership layer. Delineation of the Parks community protection zone also drew on the "community protection zone" data developed for the small-diameter wood supply analysis. This data layer was developed by buffering all private lands downwind by one quarter mile. This extended the community protection zone around Parks, northwest to the Sitgreaves Mountain ponderosa pine belt, and southwest to the NEPA area extending into the city of Williams.

Near the rim of Sycamore Canyon, stakeholders identified a large priority area based on its proximity to important wildlife habitat and concerns of fire carrying up the canyon and onto the rim. Predicted fire behavior depicts elevated potential for active crown fire in this area. The final sycamore canyon priority area identified by the stakeholders was refined using the predicted aggregated fire behavior, the sycamore rim/Williams Ranger District boundary, the KNF NEPA layer, and KNF roads data. Participants agreed to move boundaries for these priority areas from the 6th level HUC boundaries to KNF roads to simplify treatment implementation and to coincide with current KNF use of roads as boundaries for NEPA analysis

and management. The group recommended that this entire unit should be planned as one continuous priority area, integrating existing NEPA projects and taking a unified approach for fire planning.

The slopes of Bill Williams, Sitgreaves, and Kendrick Mountains were identified as priority areas, in part to protect mountaintop forests, which were considered areas of high value for watershed values and biodiversity. Vegetation differences, with mixed conifer on the mountain tops and ponderosa pine on lower slopes, set the selection of the upper boundaries of these priority areas at 2,450 m elevation. All of Kendrick Mountain was included in this analysis, although roughly one half of the area lies outside the Kaibab National Forest in the adjacent Coconino National Forest.

Stakeholders provided relative rankings of these priority areas, with the community protection zone ranked highest with Sitgreaves Mtn. slopes slightly higher than Bill Williams Mtn., Kendrick Mtn. and Sycamore Rim which were lower, but equal priority.

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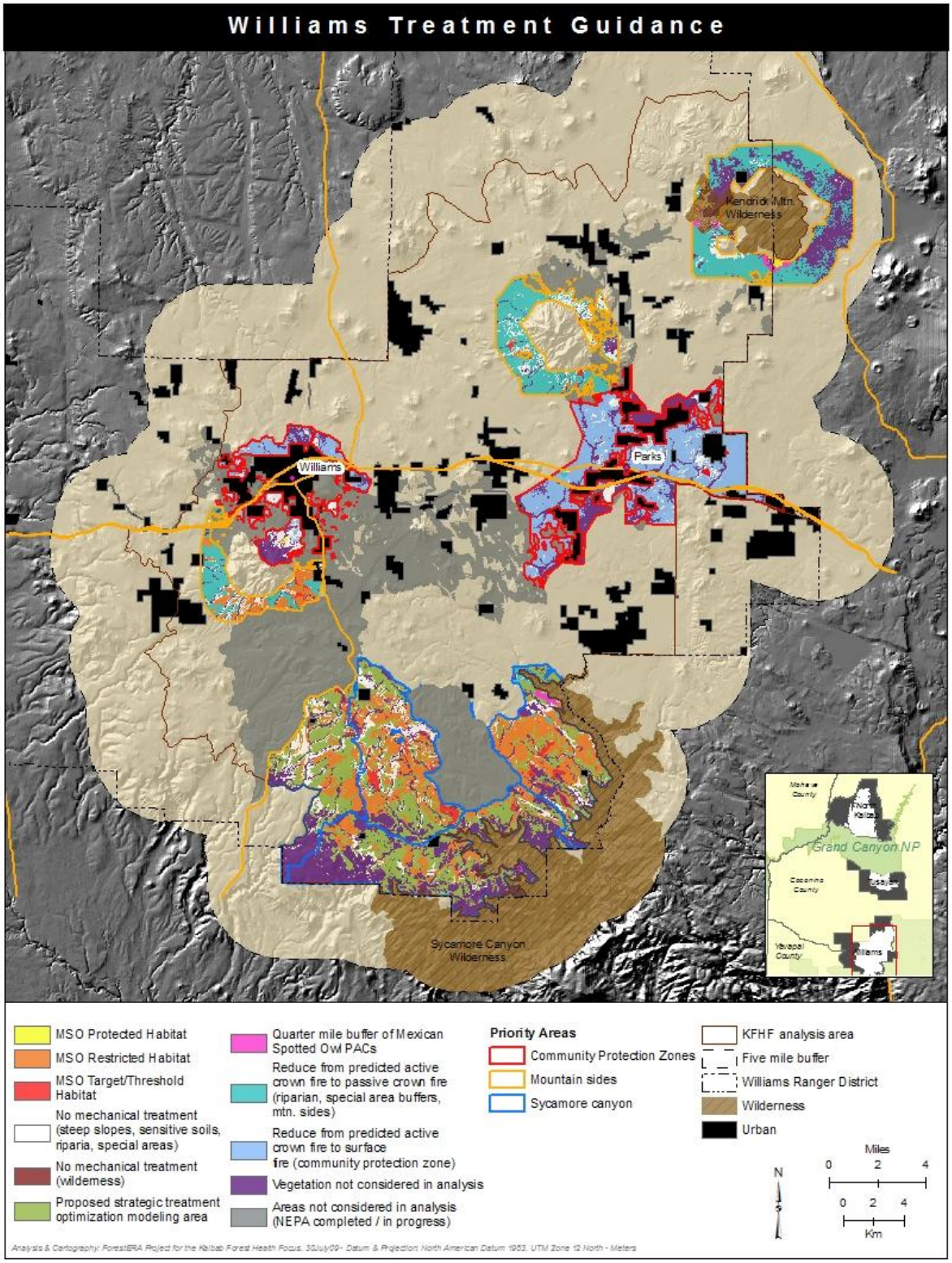
2. Williams Ranger District



B. Treatment Guidance

Development of treatment guidance for the Williams District was complicated by the lack of clarity regarding recently completed, ongoing, and planned treatments already identified. And because prioritization efforts required several revisions, less time was available for deliberating treatments. Nevertheless, the group made rapid progress during the final meetings of the Focus, and there was general agreement about appropriate management approaches. The large project areas identified mid-way through the Focus as being the subjects of ongoing NEPA analysis or active forest management were removed from further consideration for treatment guidance. This created an additional challenge of providing advice that was consistent or at least compatible with ongoing planning and management efforts, and these issues could not be entirely resolved.

On the Williams District, particularly in the southern portion, the Focus group employed previously identified Mexican spotted owl (MSO) protected, restricted and target/threshold habitats to identify and map treatment areas. This was not intended to elevate consideration of MSO above all other considerations, but to aid in identifying areas suitable for various treatment approaches, while ensuring that habitat for this threatened species would receive appropriate consideration. The US Fish and Wildlife Service provided an interpretation of the MSO Recovery Plan direction as it relates to development of restoration treatments on the Kaibab National Forest. This document is included in this report as Appendix VII. In addition to the above guidance, the group also asked that planning for these areas be carried forward in a way that addresses the needs for a) strategically placed treatments; b) landscape-scale fire management; c) future work on "priority follow-on activities requiring additional time and resources."

Community protection zones There was agreement among participants that treatments within the community protection zones should reduce the risk posed by uncharacteristic wildfire. Given that large swaths of forest around the city of Williams have undergone or are undergoing NEPA analysis, results from the Focus largely support the location and nature of work currently underway in this area. For the remainder of the community protection zone on the Williams District, Focus participants suggested more intensive treatments that would be expected to shift areas of predicted active crown fire to predicted surface fire. At the same time, the group recommended that restoration treatments within the community protection zones preserve larger trees whenever possible, and consider existing guidelines for management of Mexican spotted owl (MSO) protected activity centers (PACs; yellow on the map), restricted (orange) and

target/threshold (red) habitats. Specifically, participants requested that mechanical treatments be applied in a manner that would develop or improve MSO nesting and roosting habitats, wherever possible. In the final map of treatment guidance, Mexican spotted owl PACs are buffered by one half mileto provide defensible space around the PACs. Steep slopes, sensitive soils, riparian areas, forest service special areas, and forest types other than ponderosa pine and mixed conifer were removed from consideration for mechanical treatment. As noted above, while these areas did not enter into treatment guidance for the Williams District, the collaborative noted that they are of biological importance and should be considered in project-level planning.

Mountain sides Restoration treatments in ponderosa pine on the mountain sides (outlined in orange on the map) were suggested to reduce the risk of crown fire spreading from ponderosa pine stands into the mixed conifer on Kendrick, Sitgreaves, and Bill Williams mountains. Participants recommended that the mountain sides receive treatments that would reduce areas of predicted active crown fire to predicted passive crown fire, while operating – to the extent possible – within the MSO guidelines for protected activity centers (yellow), restricted (orange) and target/threshold (red) habitats. Where the Kendrick Peak priority area overlaps with designated Wilderness, most of the area is removed from consideration for treatment guidance, due to the presence of post-fire vegetation that is neither ponderosa pine nor mixed conifer. As for the community protection zones, participants suggested that mechanical treatment guidance be similar to those for the MSO nesting and roosting habitats; that they have a one half-mile area of defensible space around them; and that steep slopes, sensitive soils, and forest types other than ponderosa pine and mixed conifer be removed from consideration for restoration treatments for the reasons noted above.

Sycamore Rim The Sycamore Rim area is a large expanse of 50,910 acres dominated by ponderosa pine and pine/oak forest cover. Given prevailing southwesterly winds during the fire season, the collaborative group was concerned that wildfire initiating in the Sycamore Canyon Wilderness, or adjacent low-elevation areas, could spread rapidly onto the rim and into vulnerable pine and pine/oak habitats on the southern edge of the Focus study region. Participants identified these as important habitat for MSO, turkey, and other species. Several large NEPA projects in the north-central portion of the Sycamore Rim priority area reduced the area under consideration for treatment guidance, and the results from the Focus largely coincide with work already underway on the KNF. Due to time constraints, the Sycamore Rim area

received less detailed attention than other Williams District priority areas. Furthermore, deliberation regarding treatment prescriptions for mixed pine/oak forest failed to reach a clear conclusion. For these reasons, the Focus group elected not to suggest specific treatments, but rather to recommend strategic placement of smaller treatment blocks, using an optimization approach, as described in discussion of the western pine belt on the North Kaibab Ranger District (see above). ForestERA researchers have applied these tools in preliminary analyses on the Coconino National Forest, and they are employing the approach on other projects. Focus participants agreed that the use of optimization techniques to guide strategic placement of treatments was a powerful planning tool that was particularly appropriate for large areas where it was unrealistic to expect that the entire area could be treated, and in areas where there was inadequate time or knowledge for producing specific treatment guidance. While there was considerable interest in seeing this analysis completed for identified portions of the Focus study region, it was acknowledged by the group that this was well outside the scope of this project. The participants captured the nuance of their recommendation with the following language:

> "Recognizing that mechanical thinning treatments will only occur across a portion of the larger landscape, there is a need to determine the optimal spatial configuration of such treatments that jointly recognizes site-specific restoration needs, landscape-scale fire modification needs, and opportunities for maximizing the safe use of prescribed and Wildland Fire Use fire, both within and outside of areas that have previously been thinned mechanically. Further clarification of strategically placed landscape-scale treatment strategies will require additional analysis that combines site-specific restoration treatment delineation with optimization modeling intended to help develop landscape-scale fire management strategies."

It should be noted that not all participants had the same degree of comfort with the idea of treatment optimization modeling, and the group suggested that modeling of this type would need to be made transparent to the stakeholders and the public. The group also noted that all models should be tested for sensitivity to variation or inaccuracies in key variables (e.g. weather scenarios, fire spread patterns, surface fuel loads, crown based height, etc.), and that the interpretation of model results should incorporate fire managers' experiences in developing overall fire management goals for the Sycamore Rim priority area

Treatment acres reported below include ponderosa pine stands in the Sycamore Rim priority area, as well as pine-oak vegetation where it is designated as MSO protected, restricted, and target/threshold habitats on the map. As in other areas of the Williams District, treatment guidance included the suggestions that efforts be made to enhance MSO nesting and roosting habitats, where possible. The guidance for the Mexican Spotted Owl PAC located on the north east side of the Sycamore rim priority area included treatment to provide one half mile of

defensible space around the PAC itself. Steep slopes, sensitive soils and vegetation types other than ponderosa pine, mixed conifer, and the pine-oak habitats noted above were removed from consideration for restoration treatments, as agreed by the group and described above.

Table 5. Treatment guidance and amount of area by treatment type, Williams.

Landscape Unit	Guidance	Acres
Williams RD	Reduce from predicted active crown fire to surface fire (community protection zone)	15,818
	Reduce from predicted active crown fire to passive crown fire (riparian areas, special areas buffers, mountain sides)	15,206
	Proposed treatment optimization modeling	16,993
	Quarter mile buffer of MSO Protected Activity Centers	575
	MSO protected habitat	301
	MSO target/threshold habitat	1,385
	MSO restricted habitat	13,501
	No mechanical treatment (steep slopes, sensitive soils, riparian, special areas)	10,574
	No mechanical treatment (wilderness)	165
	NEPA completed or in progress	58,175
	Vegetation not considered in analysis	28, 207

Other Issues

A host of issues of importance to comprehensive ecological restoration across the Kaibab National Forest were discussed during the Focus but not explicitly incorporated into the spatial analyses presented above, due to issues of time, data availability, compatibility with the analytical approach and methods, or because they are more appropriately addressed in subsequent planning efforts and during project implementation. However, several issues came up frequently and generated valuable discussion and deliberation, and participants wanted to capture these points in narrative form, both to provide context for the Focus recommendations and to call attention to the need for additional consideration of these issues in the future.

Wildlife Considerations

Because forest restoration and management practices have the potential to impact wildlife populations and their habitats, frequent commentary and guidance was voiced throughout the Kaibab Forest Health Focus. Participants in the Focus expressed concern that wildlife impacts must be considered as the Kaibab National Forest moved from the Focus recommendations to project planning and project design. In addition, as described above, wildlife considerations played an important role in the identification of high priority areas for restoration, and in the provision of treatment guidance. In subsequent planning efforts, specific habitat requirements for multiple species will need to be assessed, and the group offered several efficient paths forward for more specific consideration of wildlife during project-level planning Overall, wildlife biologists expressed a strong desire to avoid forest treatments that could result in large, homogeneous stands of evenly thinned forest, agreeing that a mosaic of forest age and structural types would benefit most species. While the Focus effort identified relatively large areas that received particular guidance for restoration treatment, participants believed that the implementation of treatments must be carried out in a manner that results in a patchy mosaic of structural types within each of the polygons identified in the Focus. They agreed that forest treatments should be carefully designed to achieve ecological objectives, including the establishment of appropriate fire regimes and enhancement of wildlife habitat. In many cases this would involve the thinning of dense stands, but actions should be executed in a manner that encourages structural heterogeneity at multiple scales, from small clumps of trees to entire management units. This multi-scale heterogeneity, where some dense groupings of trees are embedded in more open stands and the overall density and “clumpiness” of stands varies across the landscape, is a spatial configuration that can be quantified, planned, and appreciated when considering wildlife habitat at multiple scales. Integrating this perspective into restoration

planning is likely to address many issues of importance to wildlife conservation efforts. The Focus participants agreed that treatment prescriptions should be developed in consultation with wildlife biologists in all relevant agencies (e.g., Forest Service, Fish and Wildlife Service, and Arizona Game and Fish Department) as well as wildlife researchers and specialists from interested conservation organizations and universities, to insure that these general characteristics are part of landscape-scale restoration. In addition, more detailed consideration of specific wildlife species is warranted at the project-planning level; heterogeneity alone cannot address all wildlife concerns.

Populations of listed and game species have received, on average, much more study than other species, thus there are more data to draw on for these species and more opportunities for assessing the specific effects of proposed management actions. Even for these species, however, analysis will be constrained by the data available, and forest service managers should, therefore, take advantage of the databases and expertise available through partnering agencies, universities, and conservation organizations. Specific planning for some federally-identified species is warranted, and in most cases is required by law. Some species-specific management guidance is described very explicitly, and consideration of these species in project planning is required. Examples include USFWS recovery plans for threatened and endangered species, as well as conservation agreements for species that are, or were, candidates for listing under the Endangered Species Act (ESA). In the current KNF Land Management Plan, there exists explicit guidance for managing habitat for the northern goshawk (*Accipiter gentilis*). This is the only species without a conservation agreement or recovery plan that the KNF is currently required to manage under explicit guidance for habitat characteristics. This requirement is reflected in treatment guidance provided through the Focus for some polygons identified for "northern goshawk management recommendations". Other species or groups of species – including migratory birds, Forest Service Sensitive Species, and Management Indicator Species – must be considered in project planning, but species-specific management guidance is often quite general or altogether lacking. Regardless of species' status, the Focus group recognizes that wildlife considerations must be an explicit part of efforts to move from the recommendations conveyed in this document to project planning and/or Forest Plan revisions.

Climate Change

Much of northern Arizona has experienced an increase in temperature and a decline in precipitation over the past 50 years. Many believe that this trend will continue and is likely to become more extreme over the coming century. Currently, there is a debate in the scientific

community as to the most defensible way to downscale from the Global Climate Models (GCMs) to provide an accurate regional climate prediction. Specific climatic changes expected on the Kaibab National Forest were not thoroughly discussed during the Focus because of the lack of reliable information. Additional data is needed to inform management decisions regarding how a changing climate will impact fire regimes, vegetation composition and wildlife habitat. Recent forest management decisions made during a period of extended drought are likely to capture some effects of climate change over the next 5-10 years, with respect to perceived risks to ecological values and proposed treatments that would be expected to minimize those risks. Longer term issues, such as what vegetation types might replace current Kaibab forests in the event of large fires or drought-induced die-back have not been clearly considered, and these possibilities were not discussed in depth, during the Focus. It is expected that new modeling tools and other resources will become available as priority areas for treatment identified by Focus participants enter into planning and implementation. This will provide the opportunity for Focus participants, working with Forest Service personnel, to examine treatment options in light of more recent climate change data and identify specific actions that would advance the objectives of forest restoration and wildlife conservation.

Monitoring and Adaptive Management

Adaptive management is a nearly universal goal in land and resource management and should be at the core of efforts to implement recommendations from the Focus. Despite recent advances in ecological, social, political, and economic understanding of forest issues, landscape-scale ecological restoration involves operation under considerable uncertainty. An appropriately targeted, robust adaptive management approach will allow forest managers to proceed with confidence, despite this uncertainty, and to maximize learning, increase efficiencies, and take corrective action when necessary, all as a normal and routine part of the management approach. The essential first step to adaptive management is the articulation of clear goals and objectives, a step that we believe has been advanced through the Focus. As the recommendations from this collaborative process advance and inform project-level planning and the Forest Plan revision process , these goals will be more fully articulated. Design of an appropriate monitoring plan is the next key need, and should address a modest number of effective indicator variables that can be measured repeatedly, accurately, and economically through multi-party monitoring. Identification of these variables is a challenging task, as they may or may not be the same as variables currently mandated by law or current policy. Monitoring serves several purposes, among them: 1) it verifies the degree to which implementation tracks planned work projects; 2)

it provides an unambiguous means for stakeholders to track progress and the effects of collaboratively designed restoration efforts; 3) it provides quantitative feedback regarding the effects of implementation on key variable that, together, reflect the success of management action in achieving the stated goals and objectives. This last point captures the chief value of adaptive management; a properly designed monitoring program will provide the data needed to inform needed adjustments and guide the revision of decisions and actions, such that the management plan for restoration is improved over time, and the opportunity for learning is maximized. While a robust adaptive management plan requires initial investment, and carrying out the monitoring effort requires continuity of purpose and rigor in the field and in analysis, when properly executed it is a sound investment, because it will result in the early detection of needed changes and improve management efficiencies. Volunteers and community groups should play a critical role in the implementation of multi-party monitoring.

Cultural Resources

The future management of the Kaibab National Forest is of profound importance to American indian tribes in the region, and the protection of cultural resources is among the most important issues for many stakeholders. Forest managers typically consider cultural resources in planning and implementing phases, and this is particularly true in areas where historical and archeological sites are abundant. The definition of cultural resources is much broader, however, and their consideration is not limited to archeological sites or objects currently protected by law. Cultural resources can include intangibles such as viewsheds; medicinal, ceremonial, craft or food plants; rocks and minerals; and other resources. Landscape features or particular locations can be highly significant to local tribes. Regardless of the presence of archeological sites, many areas contain important cultural resources whose consideration should be part of comprehensive restoration efforts.

The conservation of cultural resources requires the involvement of tribal representatives who can work cooperatively with the Forest Service and others to protect cultural resources in areas slated for treatment. While restoration may be expected, in the long run, to benefit cultural resources, landscape-scale treatments employing fire and/or mechanical thinning have the potential to place these resources at risk. It is incumbent upon the Forest Service and other land management agencies to seek and incorporate tribal concerns in a manner that recognizes cultural values while protecting sensitive knowledge. Cooperation and consultation is challenging because the nature of cultural resources varies among tribes, so one tribal liaison – or even one from each band or tribe – may not be able to identify or share all information about

the relevant resources, and those who retain the most traditional knowledge may be unable to participate fully in collaborative processes such as the Focus. Despite these challenges, consideration of cultural resources remains one of the most important site-specific project implementation issues. While it typically does not drive broad-scale prioritization or treatment guidance in processes such as the Focus, it will be important in project-level planning.

Several representatives of Native American tribes were invited to participate in the Focus; however, engagement was limited due to distance and staffing constraints faced by at least one of the tribal governments. These limitations are constant challenges that merit redoubled efforts by all parties to find ways to increase tribal participation. Representation of tribal values by non-tribal stakeholders is a delicate issue and can be inappropriate, unless requested by tribal authorities. Participation in the Focus by cultural resource professionals was valuable, but limited in scope and specificity. Also, the limited availability of data on cultural resources, either because data are lacking or because information is sensitive, made it difficult to represent cultural resources in a map-based manner that was compatible with the spatial analysis undertaken for natural resources. However, the inclusion of cultural resources among the factors driving prioritization and treatment guidance was an important step that should be common practice in the future, as data availability and tribal participation permit.

Desired Conditions

The term "desired conditions" is critical to the way that forest planning informs management actions. By identifying desired conditions, planners can evaluate the degree to which current conditions differ, and appropriate management actions can be identified. Identifying desired conditions, however, is not an easy task for stakeholders who are considering large landscapes that encompass considerable site diversity and that have departed markedly from what might be considered "natural" conditions. The Focus group took a somewhat different route toward prioritizing areas for restoration treatments and developing treatment guidance for the priority areas. They discussed treatments as a way to convey protection to identified values (ecological, cultural, and economic) across the landscape and reducing the factors that currently place those values at risk. This sounded vague initially, but after people put values and risks "on the map" they were better able to articulate specific treatment guidance and how these actions might be expected to reduce perceived risks. In the Focus effort, we began this way, but participants quickly moved to an approach predicated on a landscape-level strategy for modifying fire behavior through restoration treatments that addressed fire behavior, biodiversity conservation, and other objectives. Thus, desired condition was expressed at the landscape scale, rather than

the stand scale, and is reflected in the group's desire to move the entire landscape toward conditions that would allow the reintroduction of natural fire regimes. Translating this landscape perspective on desired conditions to the stand level, a task that is likely needed in order to target specific management actions, can be appropriately addressed through project-level planning.

Old Growth

Ponderosa pine forest restoration in northern Arizona should be designed to retain and restore old-growth trees. Defining Old Growth, understanding its ecological characteristics, and addressing how to promote, manage, and conserve it in the fire-adapted ecosystems of the Southwest was the subject of a conference in 2007 sponsored by the Ecological Restoration Institute. A special edition of the journal "Science and Society" is dedicated to the outcomes of that conference. See special 2007 issue of the journal Ecology and Society on Old Growth in Frequent fire forests of the American West, Vol. 12(2), available online http://www.ecologyandsociety.org/viewissue.php?sf=33.

Diameter Caps

The proposed use of diameter caps (e.g., prohibition of cutting trees over X" diameter at breast height (dbh) has been a subject of discussion and controversy for several years. Some people favor diameter caps because they are easy to understand and monitor. Others believe that using a cap is arbitrary and reduces the ability to effectively reduce potential fire behavior, meet restoration objectives and improve forest health. In addition, diameter caps have become a very political topic, to the point that debate over caps seldom lead to constructive discussion of key issues in forest management. This is in contrast to the concept that many stakeholders agree that there are, in general, too few large mature trees across most of Arizona's ponderosa pine forests, and that it is almost always appropriate to thin smaller diameter trees.

We recognize that the use of diameter caps will be resolved at a broader programmatic level and/or at the site-specific or project level. Building agreement around this issue will require a highly collaborative approach, best available science, and a commitment to learning. This issue is one that is likely to be a part of all forest management discussions in the foreseeable future, and it is one clear example of why stakeholder participation and collaboration is essential in guiding forest management.

Economics and the Role of Industry

Any intent to pursue landscape-level efforts in ecological restoration across the KNF immediately runs into the daunting question about how to pay for thinning treatments across that large proportion of the landscape where fire alone is not a practical approach. Currently, the possibility of greatly expanded federal funding for restoration treatments seems unlikely, and the engagement of industry partners at appropriate scales offers an opportunity to create value for small-diameter trees that would help pay for the costs of treatment. This collaborative group recognizes the need to develop strong partnerships with industry to achieve comprehensive ecological restoration, and the contributions from industry participants made it abundantly clear that future economic investment and production will focus on small-diameter trees and biomass. There was no interest expressed by industry participants for harvesting large trees; infrastructure for handling large material is largely gone, and recapitalization will focus on small trees for two reasons: 1) it is where the social agreement lies; 2) the bulk of the available material across the forest is in smaller diameter trees.

Given this social and ecological context, the Focus identified the need to pursue request for proposals and contracting mechanisms that could support the rapid acceleration of restoration-driven treatments in a manner that insures that ecological objectives will predominate in planning and management, but that needed assurances can be provided to industry partners. Economic sustainability and viability of appropriate industry involvement in landscape-scale restoration efforts requires that the project period be sufficient to cover amortization of industry costs of new infrastructure development. This may require a new approach to contracting, but it will be necessary for developing viable industry partnerships. Because of this, economic considerations need to be integrated into overall planning and implementation. They do not take precedence – ecological restoration is the primary objective and must inform all planning and management efforts – but economics should be taken into account because not all treatments will be economically viable and, therefore, the achievement of restoration objectives will require the balancing of mechanical treatment, fire, and other approaches across the landscape in strategic sequencing of treatments that can sustain industry partners. While these issues were peripheral to the stated objectives of the Focus, and received relatively little consideration, the economics of implementation were recognized as critical elements to be addressed as Focus recommendations inform project planning.

Discussion

In the Results, presented above, consensus was reached in support of five of the six maps developed during the KFHF meetings. At the final KFHF meeting, the collaborative group

requested revisions to the Williams Ranger District treatment guidance map as well as time after that meeting to review these revisions prior to providing support. As stated earlier, solicitation of comments for the report, including the final William Ranger District treatment guidance map, resulted in several suggestions, which were incorporated into the results presented in this report. Overall, the fact that there was such a high level of consensus is in itself a significant achievement, in that a diversity of views came together, worked through a complex and involved series of analyses, interpretations, and negotiations, and came to a point of general agreement about a suitable path forward for management of the Kaibab National Forest. This outcome emerged from concerted efforts on the part of all participants to use spatial information to discuss, and largely resolve, initial differences and disagreements. While the resulting outputs, including maps, data tables, and narrative guidance do not take the place of site specific Forest Service planning and analysis, this effort can and should guide future project planning and implementation of forest restoration treatments on the Kaibab National Forest. Of equal importance, the Focus set a precedent for collaborative efforts to build social agreement on some of the most contentious ecological and management issues facing public lands managers. Building on past efforts that included the Western Mogollon Plateau Adaptive Landscape Assessment (2004), the Statewide Strategy (2007), and the Wood Supply Study (2008), the collaborative worked at a finer scale and at higher resolution than in previous efforts. By providing sound information to a broad group of stakeholders, in a form that is easily understood and applied in a collaborative framework, the Focus was able to engage participants and benefit from their diverse perspectives, interests, and ideas for uncovering common values and building consensus on future management.

The Kaibab National Forest is committed to initiating the development of two new projects in the next year that are responsive to the recommendations, priorities, and treatment guidance that emerged from the Focus. These projects will likely be on either the Tusayan or North Kaibab Ranger Districts, with proposal development on the Williams Ranger District potentially two years out. The KNF also expressed a commitment to use the recommendations, priorities, and treatment guidance that emerged from the Focus in the plan revision process and in drafting a proposed Forest Plan. Recent legal rulings regarding the planning rule have introduced process and language uncertainty into the plan revision process; however, the efforts and results of the Focus are still relevant. Regardless of the specific constraints and opportunities, results from the Kaibab Forest Health Focus will be in the forefront of planning and project proposals in the near term, and while it may take several years for these efforts to

lead to on-the-ground implementation, the development of social agreement through public participation may result in less controversy and more rapid implementation of what most agree are badly needed restoration treatments across large areas of the forest.

Beyond the specific prioritizations and management guidance that represent the tangible results of the Focus, the collaborative process developed here is itself a valuable outcome. The Kaibab National Forest has committed to continuing this process in an appropriate form as proposed projects and other management actions move forward. Collaborative review of proposals and assessment of planned actions will be followed by implementation and a cycle of monitoring, assessment, and adaptive management.

Collectively, Focus participants expect that these efforts, combining strong science with a structured collaborative process, will result in a more transparent approach to forest management that is based on a landscape perspective that links regional and forest-wide objectives with on-the-ground management realities, facilitating the coordination of management activities across the three districts of the Kaibab National Forest. Through the continuing evolution of this approach, we hope to demonstrate the possibility of moving across scales and building a high degree of social consensus across large areas that will lead to broad social support for acceleration of restoration treatments. Taking a comprehensive, science-based approach to ecological restoration – one that draws both on site-specific knowledge and landscape-level perspective – the Kaibab National Forest will be better equipped to pursue a management paradigm characterized by greater ecological integrity and resilience, lower fuel loads and fire threat, the conservation of biological diversity, and expanding public support for active, on-the-ground restoration efforts, all focused on the areas most likely to convey benefits to the greater landscape and the people who rely on it.

References

Abella, S. R. and W.W. Covington. 2006. Forest ecosystems of an Arizona *Pinus ponderosa* landscape: multifactor classification and implications for ecological restoration. Journal of Biogeography 33:1368-1383.

Abrams, J., H.M. Hampton, J. Prather, B. Dickson, J. Rundall, Y. Xu, J. Anderson, T. Sisk. 2005. Report on the White Mountains Landscape Assessment: A Collaborative, Science-based Approach to Forest Restoration in Eastern Arizona. Ecological Restoration Institute and Center for Environmental Sciences and Education, Northern Arizona University. 104 pp.

Ager, A., Finney, M., McMahon, A., 2006. A wildfire risk modeling system for evaluating landscape fuel treatment strategies. In: Andrews, P.L. and Butler, B.W. (Comp.), Fuels management—How to measure success: conference proceedings. 29-30 Mar 2006; Portland, OR. Proceedings RMRS-P-41. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Allen, C.D., Savage, M., Falk, D.A., Suckling, K.F., Swetnam, T.W., Schulke, T.P., Stacey, P.B., Morgan, P., Hoffman, M., Klingel, J.T., 2002. Ecological restoration of southwestern ponderosa pine ecosystems: a broad perspective. Ecol. App. 12, 1418–1433.

Beier, P. and J. Maschinski., 2003. Threatened, Endangered, and Sensitive Species. In: Friederici, P. (Ed.), Ecological Restoration of Southwestern Ponderosa Pine Forests. Island Press, Washington, D.C., pp. 306-327.

Covington, W.W., Moore, M.M., 1994. Southwestern ponderosa forest structure: changes since Euro-American settlement. J. For. 92, 39–47.

Cocke, A.E. 2005. Forest change on a steep mountain gradient after extended fire exclusion: San Francisco Peaks, Arizona, USA. J. App. Ecol. 42, 814-823.

Finney, M.A. 2007. A computational method for optimizing fuel treatment locations. Intl. J. Wildl. Fire. 16:702-711.

Finney, M.A., R.C. Seli, C.W. McHugh, A.A. Ager, B Bahro and J.K. Agee. 2007. Simulation of long-term landscape-level fuel treatment effects on large wildfires. International Journal of Wildland Fire, 16: 712-727.

Fulé, P.Z., 2008. Does it make sense to restore wildland fire in changing climate? Restoration Ecology 16: 526-531.

Fulé, P.Z., J.E. Crouse, A.E. Cocke, M.M. Moore, and W.W. Covington. 2004. Changes in canopy fuels and potential fire behavior 1880-2040: Grand Canyon, Arizona. Ecological Modelling 175: 231-248.

Fulé, P.Z., J.E. Crouse, T.A. Heinlein, M.M, Moore, W.W. Covington and G. Verkamp. 2003. Mixed-severity fire regime in a high-elevation forest of Grand Canyon, Arizona, USA. Landscape Ecology 18: 465-486.

Fulé, P.Z., W.W. Covington, M.M. Moore, T.A. Heinlein, and A.E.M. Waltz. 2002. Natural variability in forests of the Grand Canyon, USA. Journal of Biogeography 29: 31-47.

Governor's Forest Health Councils, State of Arizona. June 2007. The Statewide Strategy for Restoring Arizona's Forests. Aumack, E., T. Sisk, and J. Palumbo, editors. Published by Arizona Public Service, Phoenix, AZ.

Hampton, H.M., S.E. Sesnie, B.G. Dickson, J.M. Rundall, T.D. Sisk, G.B. Snider and J.D. Bailey. 2008. Analysis of Small-Diameter Wood Supply in Northern Arizona, Center for Environmental Sciences and Educations, Northern Arizona University.

Hampton, H. M., E. N. Aumack, J. W. Prather, B. G. Dickson, Y. Xu, and T. D. Sisk. 2006. Development and transfer of spatial tools based on landscape ecology principles: supporting public participation in forest restoration planning in the southwestern U. S. Pp. 65-95 in Forest Landscape Ecology: Transferring Knowledge to Practice (A. Perera, L. Buse, and T. Crow, eds.). Springer Publishing, New York.

Hickey, J. A., J.C. Jenkins, D.S. Ojima and M. Ducey. 2007. Spatial patterns of forest characteristics in the western United States derived from inventories. Ecological Applications: 2387-2402.

Kaibab National Forest Land Management Plan (as amended) 1996.

Kaufman, M.R., W.H. Moir and W.W. Covington. 1992. Old-growth forests: what do we know about their ecology and management in the Southwest and Rocky Mountain regions? In: Old-growth forest in the Southwest and Rocky Mountain Region: proceedings of a workshop, M arch 9-13, 1992, Portal Arizona. Tech Eds. M.R. Kaufman, GTR-RM-213. W.H. Moir and R.L. Bassett. USDA Forest Service Rocky Mountain Forest and Range Experimental Station, Ft Collins, CO. pp. 1-11.

Moir, W. H. and J.H. Dieterich. 1988. Old-growth pine from succession in pine-bunchgrass forest in Arizona and New Mexico. Natural Areas Journal. 8:17-24.

The National Map: LANDFIRE Rapid Refresh National Existing Vegetation Type layer. (2008) U.S. Department of Agriculture, Forest Service: U.S. Department of Interior, [Online]. Available: http://www.landfire.gov/index.php [2008].

Prather, J.W., R.F. Noss, and T.D. Sisk. 2007. Real and perceived conflicts between restoration of ponderosa pine forests and conservation of the Mexican spotted owl, Forest Policy and Economics

Scott, Joe H and R.E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72. p.

Sesnie, S. and J. Bailey. 2003. Using history to plan the future of old-growth ponderosa pine. Journal of Forestry 101:40-47.

Sisk, T. D., H.M., Hampton, J. Prather, E. N. Aumack, Y. Xu, M.R. Loeser, T. Munoz-Erickson, B. Dickson and J. Palumbo. 2004. Forest Ecological Restoration Analysis (ForestERA) Project Report, 2002-2004.

Sisk, T. D., J. W. Prather, H. M. Hampton, E. N. Aumack , Y. Xu, and B. G. Dickson. 2006. Participatory landscape analysis to guide restoration of ponderosa pine ecosystems in the American Southwest. Landscape and Urban Planning. Vol. 78, Issue 4, pp. 300-310.

Statewide Strategy for Restoring Arizona Forests.2007. Governor's Arizona Forest Health Councils. www.azforests.org

Strom, B.A. and P.Z. Fulé. 2007. Pre-wildfire fuel treatments affect long-term ponderosa pine forest dynamics. International Journal of Wildland Fire 16: 128-138.

USDA Forest Service. 2008. Kaibab National Forest Social and Economic Sustainability Report. United States Department of Agriculture, Forest Service Southwestern Region, August 2008. 85 pp.

APPENDICES

APPENDIX I. *Data sources and development*

Vegetation
Vegetation type of LANDFIRE was the rapid refresh version with no edits. Given the large study area, the fine scale divisions provided by LANDFIRE data were not necessary. Reclassification of the existing vegetation composition data better reflected relevant classification. This is known to have error in riparian distribution.

Fire behavior
FlamMap, 97th percentile weather conditions, 18mph winds with a spatial extent of the Kaibab National Forest. Data categorized in active crown fire, passive crown fire and surface fire.

Aggregated fire behavior
The areas of active crown fire were selected from the original fire behavior model. This was smoothed using a 5x5 search window, converted to vector data type and then aggregated polygons within a quarter mile. This provided the basis of the parts of the priority areas in Tusayan, North Kaibab and Williams ranger districts.

Urban areas
USFS KNF forest/non-forest land

Hillshade
Derived from 30-m LANDFIRE national elevation dataset

Wilderness
Derived from the Kaibab National Forest Special Areas layer.

Kaibab landscapes / analysis area / 5k buffer
Subdivisions of the Kaibab National Forest used in Forest Plans. Areas based on ponderosa pine and mixed conifer merged to create analysis boundary

Inventoried roadless areas
Acquired from USDA USFS Roadless Area Conservation

NEPA Areas and Jacob Ryan Project Area
National Environmental Protection Act (NEPA) areas represent the areas that have completed or in progress NEPA processes. Both the NEPA and the Jacob Ryan project areas were mapped and assembled by USFS Kaibab National Forest.

Warm Fire Burn Area
Acquired Warm Fire boundary from the USFS Kaibab National Forest

North Canyon
This is the sixth level hydrologic unit developed by and acquired from the Natural Resource Conservation Service

Roads
US Forest Service, Kaibab National Forest roads division based on operational maintenance classification 1-5. The quality of the roads with 1)basic custodial care 2)high clearance vehicles 3) suitable for passenger cars 4) moderate degree of user comfort 5)high degree of user comfort were selected. The roads were used as boundaries in several of the priority areas. The stakeholders agreed that rather than using HUCs as divisions, that roads were a better choice as it allowed the priority areas more easily located on the ground. In addition, NEPA boundaries provided in this process showed that roads were used by the USFS as NEPA area boundaries so using them for the KFHF process creates a consistency that may be simpler for the KNF to integrate this KFHF process into their Forest Plan.

Mexican spotted owl
MSO protected, restricted and target/threshold habitat designations were developed by the Kaibab National Forest and US Fish & Wildlife Service based on US Forest Service stand exam polygons primarily containing either pine/oak or mixed conifer and provided to the ForestERA project.

APPENDIX II. ***Synopsis of early issues and concerns*** from the first meeting of the Kaibab Forest Health Focus, 22 January 2009.

This list was generated from a "round-robin" series of short statements during the first meeting of the Focus. The session surfaced a host of questions that needed to be addressed early in the process in order for the collaborative process to advance. After the meeting, ForestERA and Kaibab National Forest staff offered initial responses intended to further discussion at subsequent meetings. These were presented back to the group for further consideration and during the second meeting (18-19 February), and some topics remained in play throughout the Focus effort. A subset of these issues – those that participants chose to elaborate on and identified as important to the next steps in implementing Focus recommendations – are presented in greater detail in the body of this report, under the heading "Other Issues".

Specifics in defining desired conditions In previous collaborative processes, we have approached treatments as a way of protecting values and reducing risks. This sounds vague initially, but after people get values and risks "on the map" then they can more specifically recommend actions (treatments) that reduce the perceived risk. They can also see how treatments can enhance values (e.g., watershed health and wildlife habitat). So, desired conditions are identified by first stipulating values and risks, and then the conditions needed to reduce risk to an acceptable level (e.g., reducing probability of crown fire by X%), while protection or enhancing values (e.g., no net reduction in owl habitat). Treatments are then selected to achieve these conditions.
Specifics in defining what and how (treatments) As related above, the treatment models are fitted to particular locations, where high values and risks co-occur. Which treatments are selected depends on the difference between the current conditions and the above-described "desired conditions", and typically presupposes fixed reductions in key forest structural metrics, such as % canopy closure, basal area, and tree density. A small set of "treatment models" is typically sufficient to identify specific approaches, and collaborative groups are generally happy to leave greater detail to the professional planners and silviculturalists.
Implementation efficiency--lasting treatments This can be dealt with in conversation that stresses the need to be fairly aggressive (or not, depending on the group's deliberations), such that the desired reduction in threat and/or enhancement of values is met in a manner that will not require frequent reentries. In practice, most people immediately embrace the idea of thoroughness, and many want to leave any consideration for future entries for another planning cycle or set of meetings. This is because there is a front-in buy-in to the idea of restoration of forest ecological processes, as we have already reached in the KFHF.
Priority areas fit filter of sustainability and ecosystem structure and function Priority areas are identified in part based on their deviation from a sustainable structure to support key ecosystem processes and functions.
No duplication of effort; strive for efficiency I think we have already made it clear that we MUST be efficient, and the group seems ready to accept previous outcomes as our starting point, and to move quickly. Avoiding duplication of previous efforts has been agreed upon already; avoiding possible duplication of other planned efforts is something the Forest Service will need to track and provide guidance on.
Get NEPA done, min of 5 treatment areas ready to go Discussion left it unclear whether NEPA readiness should be a factor in prioritizing landscape units. My sense was that there was an initial interest, but that after brief discussion most participants felt that the potential contribution of

a unit to landscape-level restoration and fuels reduction should be the driving factor in prioritization, rather than NEPA-ready acres. This should be addressed again in the second meeting.
Long term contracting mechanisms This seems to be outside the prevue of this KFHF process, but could be the subject of discussion and a future statement from this collaborative group regarding the need to develop workable contracts that insure restoration-driven treatments, while providing needed assurances to industry.
Best value contracting I think there is general agreement that contracting should allow industry capacity to play into efficient treatment. I am not sure if there is a more specific meaning to this term.
Need to see possible treatment effects demo sites There was discussion about offering a field trip to participants. While this is always fun and informative, it is difficult to visualize the landscape from a field trip. It may, however, be a way to increase comfort level with what the treatment models look like, on the ground.
Is there enough money for implementation This is similar to the issue of contracting and efficiencies, and is largely outside the prevue of this meeting. It seems clear that the answer is 'no' unless costs can be offset significantly through contracts that will draw new investment from industry, while retaining the ecosystem-based objectives of treatment. (See: *Creative partnerships with industry to get things done)*
Non T&E Plant diversity I think this is relevant to all issues of biodiversity. There is interest in understanding effects on all species, but we do not have the ability to model all species, or even a random subset, spatially. There are a range of issues we can look at, such as land cover diversity metrics, but much of this will require discussion and interpretation from our wildlife expert participants, such that the key derived layers, including forest structural attributes, can be linked to desired conditions. This topic must be addressed through expert opinion and group deliberation, in addition to modeling of a few key species.
Invasive species risks There is potential to explore models of cheat grass invasion in the North Kaibab ranger district, but not the Williams or Tusayan. This issue also will require expert opinion and group deliberation.
Reasonable set of desired future conditions (DFCs) and management understanding in place See above.
Get pieces in place that carry the fire we want (soils and understory) and will answer the wildlife questions This comment implies that we must consider the grasslands and meadows in the forest mosaic. I think we can discuss whether and where treatments should increase or enhance meadow habitats, and where the opening of canopies would enhance understory development. While this is generally a product of most thinning treatments, we may want to specifically target some areas for more aggressive thinning, based on these concerns.
Maintain public support All participants are expected to represent the KFHF to their constituents and to bring those people's ideas to the table. This will help build and maintain public support. We also should publicize the outcomes, how they differ from past efforts, and how people can support future projects and help keep things on track. We will forge some level of understanding, and we will provide some measure of the agreement, which hopefully will be high and can be explained and demonstrated as a means of building public support.

Smoke effects--how much can we burn We are not able to model this explicitly, but we can look at the prioritized units, and then consider the intensity of the prescribed fires that we would expect to take place after thinning. By drawing on expert opinion about burn conditions and prevailing winds, we could inform a much more helpful discussion of this issue than is currently possible. In addition, a group statement could be crafted to capture the group's concern for smoke effects for inclusion in the final report.
Structural heterogeneity at clump level to landscape Clump level will have to be addressed, specifically, in the project plan; however, treatment models could include a descriptive element such as "Heavy thin, leaving x& of the BA in clumps of Y ac", or something like that. Modeling this at the scale of a few acres is probably not helpful until final NEPA-relevant project plans are written.
Restore natural processes This is the fundamental objective of everything we are working on through the KFHF.
Take macrocriteria approach rather than micro I believe that this is what we are proposing to do, by focusing on these forest health issues at the landscape level. By starting out with the Kaibab Forest Landscape Units (units as seen on the maps included in the KFHF folder), and prioritizing them (and perhaps redrawing some boundaries) based on their potential for impact across the large landscape, I believe we are, by definition, dealing with the "macrocriteria".
Tackle "stopper" issues This list is one of several efforts undertaken to uncover, consider, and respond to issues from participants that could slow or stop progress in the Kaibab Forest Health Focus, if not addressed early on.
Diameter cap The proposed use of diameter caps (e.g., prohibition of cutting trees over X" diameter at breast height (dbh) has been a subject of discussion and controversy for several years. Some people favor diameter caps because they are easy to understand and monitor. Others believe that using a cap will set a precedent that will make it harder to cut big trees in the future, even where it may be appropriate. Others worry that caps do not make sense in the context of traditional silvicultural practices. In addition, diameter caps have become a very political topic, to the point that debate over caps seldom lead to constructive discussion of key issues in forest management. This is curious, because almost all stakeholders agree that there are, in general, too few large mature trees across of most of Arizona's ponderosa pine forests, and that it is almost always appropriate to thin small-diameter trees. Because of this, we will focus on current conditions and actions that should be taken to reduce factors that place valued forest resources at unacceptable risk. Where risks include fire, we will focus on what sort of thinning is best able to address the issue of unnaturally severe fire. In cases where risk cannot be reduced without cutting large trees, we will discuss this situation, and the options before us, with participants and we will try to find agreement about large trees without using a firm, proscriptive diameter cap. At the request of the Kaibab National Forest, we may examine what the predicted effects of implementing a diameter cap and compare that with the outcomes from our collaborative process.
Economics of implementation Details regarding the economics of implementation will be articulated in contracts with industry or in the internal project planning work of the Forest Service. However, we are able to incorporate economically relevant issues indirectly, such as distance from the road network (which influences the economics of utilizing small-diameter timber), or the implications of clustered vs. dispersed treatment areas.
Creative partnerships with industry to get things done Much of the impetus for this and

other efforts comes from the hope that we can work together to "get things done", not only in the planning office, but on the ground. Forest restoration can be expensive, and almost all realistic visions of working at the landscape level to address large areas over the 5-10 year time frames needed involve participation with industry to carry out the thinning that is necessary. In the KFHF, we are going to build on previous agreements and assume that contracts with wood utilizers will help to offset the costs of treatments.
Fire patterns across landscape Fires affect planning in two ways. They burn areas that might have been treated otherwise, thus altering the landscape and affecting priorities and proposed treatments. Fires also represent a potentially useful and cost-effective tool for implementing restoration treatments. While we must accept the former, the latter is, to some extent, controlled by people. By identifying forest conditions, we can anticipate how fires might burn, and this information may influence where we thin mechanically, where and when we allow natural fires to burn, and where and when we light prescribed fires. All involved realize that fire is neither good nor bad; the real question is when and where it is appropriate. Addressing these issues requires us to take a landscape approach and to see the forest as a mosaic of conditions that change with time, and that the patterns in this forest mosaic will influence fire and in turn be influenced by fire. Understanding the patterns across the landscape is a first step toward working wisely with fire.
Prioritization of areas where clear social consensus This is one of the key objectives of the Kaibab Forest Health Focus, and how we intend to accomplish this is described above and in other documents provided to the collaborative group.
Rely on what has been accomplished to date We have agreed to start by honoring these accomplishments, and using these results as our starting points.
Social consensus key criteria We will strive for a consensus-based process that honors all participants and empowers them with sound science as a support to the collaborative process.
Specificity about treatments for DC on the ground These issues – treatment models and desired conditions, are address both above and below.
Consideration of Climate change in setting priorities Many believe that northern Arizona will become hotter and drier due to directional change in the global climate. Specific climate changes expected on the Kaibab National Forest have not been thoroughly discussed, although recent scientific publications speculate that fires may become more frequent and more severe, echoing previous concerns that were less clearly supported by science. All social deliberation on the topic of forest management in recent years has occurred during the current period of extended drought, and most have assumed that conditions to plan for should represent extremes (e.g., 90-97th percentile fire conditions). Thus, these efforts do a pretty good job at capturing the likely effects of climate change over the next 5-10 years, with respect to risks and proposed treatments. Longer term issues, such as what forest or non-forest vegetation types might replace current Kaibab forests in the event of a large fire or drought-induced die-off have not been clearly considered, and the KFHF may wish to discuss this, or elaborate on how climate change might affect fire threat or fire risk, or other parameters of interest.
How should we consider climate change in framing decisions See above
Consensus agreements not so constrained to restrict treatments aimed to create forest health and sustainability The Kaibab National Forest and the ForestERA Project have identified the list of objectives passed out at the beginning of the first meeting. In addressing these objectives,

the consensus agreement that we seek could set constraint to treatments that may be quite different than what has been envisioned in past planning efforts. Thus, it is important for all stakeholders to state early on what their objectives are, and to work openly and constructively as part of the collaborative process to explain and represent their views of what constitutes, in this case, forest health and sustainability. Through open, respectful dialog, supported when possible by strong science, concerns about the possible outcomes of collaboration can be addressed. Our experience has been that many concerns never materialize, and that important concerns, when understood by all, usually can be addressed in a more creative and constructive manner than would have been possible by anyone working in isolation.
Effects of burning on grazing Prescribed fire and Wildland Fire Use, as well as wild fire, can make reduce or eliminate grazing from specific pastures for up to several years. Fire also can damage infrastructure if it is not planned or anticipated. Our process cannot resolve these impacts, but effective planning can alert range managers and ranchers to proposed burning so that proper preparations can be taken, and alternative pastures can be identified.
Protection of grazing infrastructure (fences tanks etc) See above.
Restoration of resilience (past and future forest conditions) Resilience has a specific ecological definition that involves the ability of an ecosystem to rebound from disturbance, such as fire or drought. All actions discussed, planned, and carried out as part of the KFHF are intended to restore ecosystem functions, and thus resilience to the forest. However, in an effort to minimize the use of specialized terminology and technical jargon, we have use the work "health" in the title of this collaborative process, with the understanding that a healthy forest is resilient to stressors.
Think about future fire regime with drought See above; our fire modeling and subsequent use of the outputs assumes extreme conditions.
Areas of high risk for habitats Wildlife habitat is among the values we typically consider a "values" during the prioritization. Specific habitat needs also factor into discussions of appropriate treatment practices.
Area of high risk for humans Communities and the 'urban-wildland interface' are typically key factors in prioritization.
Protection of cultural resources When data regarding the location of cultural resources are available, they can be included in prioritization efforts. When this information is not available or its use is restricted, it cannot be used in the spatial analysis that lies at the center of the ForestERA process. This more often is a consideration at the project or implementation level.
Not look to past but to future with climate change See above. Climate can be included in certain specific analyses. It can also be an important topic of discussion that brings the collaborative process to a general understanding that will, indirectly, influence spatial analysis.
Post-fire issues (salvage) Salvage issues, particularly on the Warm Fire burn area, are controversial. They have the potential to side-track the work of this group on its primary objectives: prioritize 2-3 landscape units in each of the Kaibab National Forest's 3 districts, and suggest restoration-based forest treatments for each. It may be necessary to work on the salvage issue when prioritizing or identify recommended treatment practices for the North Kaibab Ranger District, but we will address that if and when we come to it. The Wood Supply working group chose to set this issue aside due to its controversy and so as not to distract from their goal of reaching consensus.

NEPA ready proposed sites included The group may choose to prioritize landscape units based on the number of NEPA-ready acres. This would be a break with the "values at risk" approach, and a move toward an approach that has been commonly employed to get the fasted and cheapest acres treated, wherever they may be. The group can decided if they wish to consider this, and if so, how.
Monitoring mechanism to determine if meeting DC and what it might look like The design of a monitoring plan to assess the success of the Kaibab National Forest in meeting its planning objectives is an important task that is currently outside the objectives and purpose of the KFHF.
Old growth and definition Defining Old Growth, understanding its ecological characteristics, and addressing how to promote, manage, and conserve it in the fire-adapted ecosystems of the Southwest was the subject of a conference in 2007 sponsored by the Ecological Restoration Instituted. A special edition of the journal "Science and Society" is dedicated to the outcomes of that conference. See http://www.ecologyandsociety.org/viewissue.php?sf=33
Natural biological diversity and dynamic systems As with consideration of resilience (see above), all actions discussed, planned, and carried out as part of the KFHF are intended to restore and conserve native biological diversity and the functioning of dynamic ecosystems, consistent with broadly accepted definitions and descriptions of restoration ecology, landscape ecology, and conservation biology.
Start with desired conditions and then where and how Rather than trying to express desired conditions on every acre of the Kaibab National Forest, a process that has proven difficult to execute effectively, our collaborative approach starts with values or valued landscape features, then examines them with respect to the level of threat they are facing. THEN we look at conditions that would reduce the threat(s) to an acceptable (desired) level, and we select treatments that would achieve that reduction in threat. This process has proved to be more inclusive of stakeholders who cannot identify desired conditions, due to a lack of professional training in forestry and forest planning, yet it still allows them to participate meaningfully in stewardship of valued public lands and resources.
Critical habitat for "non-existent" MSO on N. Kaibab Conservation of the Mexican Spotted Owl is a controversial issue, as indicated by the wording of this comment. Critical habitat for MSO has previously been designated on the North Kaibab Ranger District, and this fact is sufficient to require that this habitat is managed according to the stipulations of that designation. Similar concerns about wildlife habitat have emerged in early discussions, and where possible we will let the data inform this group regarding the presence or absence of specific wildlife species and how their habitat quality should be considered in the Focus. There is good representation on the working group for informed consideration of wildlife values.
Economic efficiency See above for several related comments. Our prioritization effort can take into account several indicators of economic efficiency. For example, clustered treatments may be more efficient that widely dispersed treatment. However, clustered treatments may be less effective at reducing the threat of large fires. These are the sorts of trade-offs that the group may need to work through, with support from science and GIS technology.
Wood supply For the Williams and Tusayan Districts, data on the wood supply generated from restoration-based forest treatments has been calculated and can be drawn upon, where appropriate. The Grand Canyon Trust has agreed to make data and funding available to generate similar layer for the North Kaibab Ranger District. We hope, but cannot guarantee, that this generous offer will result

in that information becoming available in time for consideration during the KFHF.
Watershed health Watershed health is a general term referring to issues such as erosive potential, flooding risks, water quality issues, etc. During the WMPALA ForestERA developed preliminary watershed models to capture some of these issues, and the outputs from these models were used along with many other factors in prioritizations and treatment recommendations. We do not have watershed models for the Tusayan or North Kaibab Ranger Districts, and WMPALA models are currently undergoing a more rigorous validation process. Based on the results of that research, the group may decide to use or exclude these models in its work.
Viewshed around Grand Canyon NP Aesthetic considerations can be taken into account by positively or negatively prioritizing Landscape Units, based on their visibility from Grand Canyon or other locations.
Strategic and efficient treatment configurations at landscape scale (fire) The configuration of treatments can be done in an expert-driven manner, in a manner driven by "black box" analytical models, or by a deliberative process. It is important to first discuss what is meant by "efficient" and "strategic". For example, the "Treatment Optimization Model" (TOM) developed by Finney and colleagues, often generates a plan for many small treatments scattered across large areas. This approach attempts to optimize efforts to slow the rate of fire spread, given a specified number of treated acres. However, the resulting treatment plan may be very expensive, in terms of per-acre treatment costs, because the small treated blocks are spread out, requiring more travel time and generating other cost inefficiencies. Clear understanding of what is being optimized is needed in order to address the desired efficiencies and thus a truly strategic plan. For public lands and the use of public funds, this is perhaps best resolved through the collaborative process.
Look across scales As stated elsewhere, the KFHF is, must, and will continue to address all of these interrelated issues at multiple scales.
Biological and social values of non-listed species especially on N. Kaibab and game species We can address broad issues related to wildlife and habitat, but it is true that sensitive species and hunted wildlife populations have received, on average, much more study than other species, and thus there is more data to draw on for these species. On the North Kaibab, we hope it will be possible to address huntable species (e.g. mule deer) as well as sensitive species (e.g. northern Goshawk), and more common species (e.g. some passerine bird species). However, this will be constrained by the data available, and to date little research has attempted to represent species distributions and habitat quality across the Kaibab Plateau.
Incorporate spatial heterogeneity from project site into bigger landscape picture at multiple scales (wildlife concerns) See other responses to similar questions regarding scaling issues.
Climate change and planning for resiliency See above and below for responses to similar questions regarding climate and resiliency.
Connectivity and corridors This is an issue of current focus for many conservation biologists. New approaches to modeling connectivity are being developed, and some exciting work is underway on the Kaibab National Forest. However, results from that work will not be available for the KFHF, and most work on connectivity in a planning context continues to be based on expert opinion. Efforts to incorporate this into earlier landscape-level collaborative processes have shown that there is little agreement among experts, and that application of divergent opinions can lead us away from

consensus. For these reasons, we will look for new and unbiased existing sources of information of wildlife connectivity and corridors on the Kaibab National Forest. If we are unable to locate this information, or to use emerging techniques to identify corridors efficiently, we will be limited in our ability to address connectivity in this process.
Adaptive management Adaptive management is almost a universal goal in land and resource management. It involves clear goals, an effective monitoring program, and a social decision framework that values new information and revises decisions and management actions based on data. Our efforts, if successful, can provide clear goals (these will need to be further refined and made more specific through the NEPA process), but the design and implementation of a monitoring plan is beyond the bounds of the KFHF, and revision of the planning process and decision making apparatus of the US Forest Service is, likewise, outside our purview. Nevertheless, outcomes from the KFHF may indicate the need for effective adaptive management, and there is no reason that this group should not call for this and specify what is needed, in general terms, in a group statement
Mutually agreed upon goals Objectives of the KFHF have been distributed and discussed by the working group. These discussions can continue, and objectives can be revised, as long as they are consistent with the agreement between the Kaibab National Forest and the ForestERA Project.
Maintenance and restoration of abiotic and biotic factors We will strive to prioritize areas and propose possible treatments, such that desirable factors or characteristics will be restored and/or conserved, and undesirable factors will be reduced or eliminated.
Desired conditions across time scales See several other responses to "desired conditions" that can be found above and below.
Tribal values Several representatives of Native American tribes have been invited to participate in the KFHF. Representation of Tribal values by non-tribal stakeholders is inappropriate, unless they participate at the request of tribal authorities. We hope for broad tribal participation, so that these values are represented.
Traditional uses Stakeholders are free to represent their traditional uses, or other traditional uses that they are aware of. This information may be used by the collaborative group to prioritize areas, or to identify appropriate treatments for those areas that receive a high proportion for treatment or other forms of management attention.
Tribal concerns We are aware that several tribes are deeply concerned about the future of the Kaibab National Forest, and we hope they will be able to participate in the KFHF (see above). In all cases, we will take into account and honor the expressed concerns and desires of all Tribes, to the best of our ability.
What do we mean by consensus? We mean a set of agreements reached by a group as a whole. Consensus defines the areas that the whole group can support and promote, once our work is complete. This does not mean that all participants must come to complete agreement on every issue, or that the agreement must detail every issue in forest management. Other issues may persist, outside the area of agreement, and may require additional work, negotiation and compromise But the consensus we hope to reach through the Kaibab Forest Health Focus will represent a "zone of agreement" that all participants believe will move us in the right direction regarding forest management, fire, and stewardship.
Group Decision making We will work as a group, and we will try to reach agreement through

consensus, using a variety of approaches to clarify positions and guide discussion and negotiation. Whenever possible, we will avoid direct voting, and instead we will make decisions by acclimation.
Explicit Road Map/objectives at each stage We have developed a "road map" that is and will continue to be reflected in the agendas for each meeting. Objectives were passed out at the beginning of the first meeting, and constitute an expanded versions of the original objectives specified in the contract between the ForestERA Project and the Kaibab National Forest.
Desired conditions made explicit? The ForestERA collaborative process is not the same as the US Forest Service planning process, though they share many objectives. While the Forest Service details "desired conditions" on a stand-by-stand basis, the ForestERA process focuses on "values" and "threats", as described above. In both approaches, it is critical to understand the forest ecosystem well enough to be able to identify how we propose to change current conditions to more appropriate future conditions. In the Kaibab Forest Health Focus we will identify high-priority areas (where values are at risk), and we will identify appropriate management treatments for these high-priority areas. Our treatment models assume explicit changes to current conditions, and we will select the appropriate treatment for moving current conditions to conditions where threats are reduced to an acceptable level. These conditions that represent an acceptable level of risk to the high-value resources in a particular place can be termed "desired conditions" for the purposes of forest planning; however, this is not the primary objective of our collaborative process.
Potential field trip to see the effects of treatments This was suggested by several participants, and it may be possible to visit sites where treatments similar to those presented in our treatment models have been implemented. This could be helpful for getting a feel for what the forest might look like after treatment. However, it is difficult to understand the spatial scale of the effort we are undertaking through the KFHF by visiting a few places on the ground. When we are prioritizing areas of 10K-20K based on the impact of treating these areas on the larger landscape – that is an area of 100L acres or more – it is also helpful to develop a landscape perspective, one that is more akin to the view from 30,000 ft than the view from the forest floor. Both are valuable – in fact essential – and a field trip can be pursued if participants decide it is worth an extra day of their time.
List of previous agreements goals for consideration and adoption Participants received Executive Summaries of the agreements reached in the Western Mogollon Plateau Adaptive Landscape Assessment (WMPALA), the Statewide Strategy for Arizona's Forests, and the Small-diameter wood supply project. In addition, we will continue to present examples that draw on past agreements, and we have prepared a summary of these agreements, as well.
Short descriptions of how issues analyzed and resolved This was provided in summary form at the first meeting, and at the request of participants a "data meeting" that will explore the data sets and how they can be used in analysis, prioritization, and assessment.
Breakout groups if necessary to resolve or investigate issues We have tried to keep the working group to a size that will allow effective discussion and deliberation without breaking into smaller breakout groups. Working in breakout groups is an effective way to explore various approaches to ill-defined problems. Given the level of effort that has already been dedicated to landscape prioritization and collaborative forest management, we believe it is more productive to work as one efficient group to "scale-down" previous agreements to a level that is relevant to the work of the Kaibab National Forest.
Use most recent data layers At the first meeting, the group decided to use data from the Wood Supply Analysis wherever possible, and to go back to older data sets only when necessary to

implement approaches specified by the group.
Start with Williams and older derived data layers At the first meeting, the working group requested that ForestERA develop a proposal for prioritization of the Williams and Tusayan Districts, drawing on the prioritization approach from WMPALA, but using the newer data, where possible. We will present the results of this analysis at the second meeting.
Desired conditions at multiple scales? By definition, the collaborative group will be working at multiple scales – from the scale of the entire forest, to that of each district, to the scale of the Kaibab National Forest's "landscape units", and finally to subareas within those units (or alternative units identified by the working group), which will be the subject of deliberation regarding appropriate treatments.
Definitions of treatment types ForestERA has previously developed treatment models that define explicit changes to the forest structure (i.e. "reduce canopy closure by X%, basal area by Y%, tree density by Z%). These models will be presented, discussed, and possibly modified by the collaborative group at the second meeting, and the group will be asked to discuss under what conditions each treatment model might be applied.
Agreement of priority unit size By previous agreement, we will start by considering the established "Landscape Units" where are described in the Kaibab National Forest Plan. These areas of 10K-20K acres each will be the subject of a prioritization effort that will examine values and threats across the forest. Landscape units that contain large areas where values are at risk will be prioritized. If the group wishes to redraw the boundaries of these landscape units it can; they are intended to provide a starting point for the prioritization effort, and a guide as to the size of priority areas that are practical, from the perspective of the Kaibab National Forest planning office.
Future condition constraints Please see discussion of future conditions, above.
How to deal with temporal dimension? Trees grow, fires burn, climate varies year-to-year, and stakeholders and their opinions vary over time. Thus, temporal variation is a given. The Kaibab Forest Health Focus can only describe forest conditions and social agreement at a point in time, namely, June 2009 when the effort will be concluded. However, in reaching that agreement, whatever form it may take, we will work hard to maintain a focus that addresses the next 5-10 years in a responsible manner that provides useful guidance for future forest management activities. We should assume that the world is static, but we must not let the fact that "things change" stop us from thinking ahead, planning, and acting in an open, scientifically sound, and collaborative manner.

APPENDIX III. *Invitation letter and participation matrix*

Kaibab Forest Health Focus participant invitation letter

12 January 2009

Dear Friend of the Kaibab,
The Kaibab National Forest recently contacted you about participating in the Kaibab Forest Health Focus, an effort to identify those areas of the forest most in need of ecological restoration and fuels reduction, as well as the management actions that would be most appropriate for achieving those objectives. These efforts will build on the work of previous collaborative processes that have achieved similar goals across larger areas, but with less detail, such as the 2007-08 Analysis of Small-diameter Wood Supply in northern Arizona. The Kaibab Forest Health Focus will take an important step forward by "zooming in" on the Kaibab and working in greater detail, in a manner that will provide guidance to forest planners and decision makers about the next steps for new projects that the forest will be developing in the near future. Our work will be taking a big step toward getting much needed forest restoration projects "on the ground".

The Kaibab Forest Health Focus will take place in a series of meetings, at the invitation of the US Forest Service and convened by the Forest Ecosystem Restoration Analysis (ForestERA) Project, based at Northern Arizona University. We are contacting you to ask that you join us for a series of meetings during the first half of 2009, as part of a smaller, more committed, "Working Group" that would engage in the detailed work of identifying priority areas and designing possible treatment practices. Working group members will attend all meetings and "drive" the process. As indicated in Forest Supervisor Mike Williams' letter, there will be a larger group monitoring the Kaibab Forest Health Focus and providing feedback to the Working Group. The ForestERA Project will provide maps and other data, and the tools to present and analyze this scientific information in the manner that supports, rather than directs the Working Group. The meetings will take place in a collaborative setting, with approximately 15 working group members. Our goal is to reach a high level of agreement about which areas (of approximately 10,000 acres each) are the highest priorities for thinning and/or prescribed fire (or other management actions) on each of the Kaibab National Forest's three Districts – the Williams, the Tusayan, and the North Kaibab. Then, we will collaboratively identify and propose appropriate restoration-based forest treatments. It is a big challenge, but one that past successes suggest we can meet. And as is evident in the Forest Supervisor's letter, the Forest Service intends to use this information to inform future projects and the forest planning process. We sincerely hope that you can join us.

We have attached the Supervisor's letter, which was sent last Thursday, via email, in case you have not yet received it. His letter includes proposed meeting dates and locations on the NAU campus. Because our first meeting is planned for January 21-22, less than two weeks away, a representative from either the Kaibab National Forest or Northern Arizona University will be contacting you by phone in the very near future. We will be asking you to commit to attending all four Working Group meetings, starting with next Wednesday afternoon and Thursday morning. We look forward to your participation, which will provide the Forest Service with grounded and practical citizen input regarding the future of Kaibab forest management.
Sincerely yours,

/s/ Jill M. Rundall	*/s/ Thomas D. Sisk*
Jill M. Rundall	Thomas D. Sisk
Research Specialist Sr., ForestERA Project	Professor of Ecology

Kaibab Forest Health Focus invited participants

21-22 Jan	18-19 Feb	28-29 Apr	2-3 Jun	Small Breakout 1 March 2	Small Breakout 2 March 13	Tech Meeting Feb. 13	Name	Affiliation
x	x	x	x	x	x	x	Ethan Aumack	Grand Canyon Trust
x		x	x	x	x	x	Bill Austin	US Fish & Wildlife Service
x	x	x	x	x	x		Pascal Berlioux	Arizona Forest Restoration Products, Inc.
x	x	x	x	x	x	x	Ed Smith (Alt:Brenda Burman; Sarah Hurteau)	The Nature Conservancy
x			x				Kim Crumbo	Grand Canyon Wildlands Council
x							Rick Erman	Friends of Anderson Mesa
x	x		x		x		Pete Fulé	NAU, Ecological Restoration Institute
x	x		x				Steve Gatewood	Greater Flagstaff Forest Partnership, WildWood Consulting, LLC
x	x	x		x	x		Angela Gatto	KNF, North Kaibab Ranger District
	x						Martha Hahn	Grand Canyon National Park
x	x	x	x	x	x	x	Stacy Hamburg	Sierra Club
x	x		x				Shaula Hedwall	US Fish & Wildlife Service
x	x	x	x	x	x	x	Mark Herron	KNF, Williams Ranger District
x	x	x	x	x	x	x	Bruce Higgins (Alt: Holly Kleindeinst)	Consultant - KNF, Supervisor's Office
x	x	x	x				LeAnn Skrzynski	Kaibab Band of Paiute Indians
x	x	x	x	x		x	Jim Koons	Public participant
x	x	x	x			x	Ariel Leonard	KNF, Supervisor’s office
x	x	x	x			x	Taylor McKinnon (Alt:Jay Lininger)	Center for Biological Diversity
x	x	x	x	x		x	Jim Matson	Vermillion Services
x							Frank McNelly	Coconino County Res Conservation District
x	x	x		x	x		Andi Rogers	AZ Game & Fish Department
x	x	x	x		x	x	Erik Nielson	NAU, Forest Ecosystem Restoration Analysis
x			x			x	Brett Dickson	NAU, Forest Ecosystem Restoration Analysis
x	x	x	x	x		x	Jill Rundall	NAU, Forest Ecosystem Restoration Analysis
x			x		x	x	Steve Sesnie	NAU, Forest Ecosystem Restoration Analysis
x	x	x	x			x	Tom Sisk	NAU, Forest Ecosystem Restoration Analysis

APPENDIX IV. *Kaibab Forest Health Focus meeting agendas and meeting minutes*

Kaibab Forest Health Focus
Meeting 1
January 21, 1-5 pm and January 22, 8:30 am-12 pm, 2009
Northern Arizona University, Flagstaff
Applied Research and Development Building, "Large Pod" Meeting Room

Day 1 – 21 January

12:30 – 1:00 pm	Registration
1:00 – 1:10 pm	Welcome (Mike Williams, Supervisor, Kaibab National Forest)
1:10 – 1:30 pm	Objectives (Bruce Higgins) • Move toward restoring fire adapted ecosystems • Reason for Partnership with ForestERA
1:30 – 2:30 pm	Introductions (Erik Nielson) • Commitment to a collaborative effort • "Rules of engagement" for collaborative process
2:30 – 3:00 pm	Summary of previous collaborative projects and outcomes (Tom Sisk) • Setting the stage for the Kaibab Forest Health Focus • "Downscaling" the results from previous large landscape assessments • Providing an efficient model for others to move from vision to action
3:00 – 3:10	Break
3:10 – 3:40 pm	Presentation of the needs and objectives of the Kaibab National Forest (Ariel Leonard) • How this effort "fits in" with planning efforts • Why use a collaborative process? • What "success" will look like for the Kaibab National Forest
3:40 – 4:20 pm	Discussion of the process and the opportunities/benefits for participants. Open discussion of "what success will look like" (Erik Nielson)
4:20 – 4:40 pm	Review of overall timeline and tomorrow morning's agenda (Erik Nielson) • Produce hard copy schedule of final dates and times for future meetings (Charlotte Minor)
4:40 – 5:00	Comments from the Monitors
5:00	Adjourn
6:00	Informal Social at Beaver St. Brewery (11 S. Beaver St.)

Day 2 – 22 January

8:00 – 8:30 am Registration; Coffee and Bagels

8:30 – 8:35 am Welcome and clarification of today's objectives (Erik Nielson)

8:35 – 9:50 am Identification of key issues and concerns that will frame analysis for the Kaibab Forest Health Focus (Erik Nielson)

- What questions need to be addressed in order to achieve our objectives?
- Which of these have been adequately addressed in previous efforts, and which will require new analysis?

9:50 – 10:00 am Break

10:00 – 10:45 am Presentation of spatial data available (Jill Rundall)

- ForestERA data
- Forest Service data
- Other data sources

10:45 – 11:00 am Guidance from the group about information needs (Erik Nielson)

- A "GAP Analysis" of information needs to guide KNF and ForestERA staff, working together, prior to the next Focus meeting.

11:00 – 11:30 am Comments from the Monitors and discussion

11:30 – 11:50 am Key issues and objectives for next meeting (Ariel Leonard and Charlotte Minor)

- Data development
- Planning specific approaches to prioritization and treatments that will guide spatial analysis over the long work period between the 2nd and 3rd meetings
- Avoiding duplication of effort so that we make best use of time and resources
- Tackling tough issues so that we reach a durable, meaningful agreement
- What else does the group need prior to the next meeting?

11:50 – 12:00 pm Closing comments from Kaibab National Forest line officers

12:00 pm Adjourn

Kaibab Forest Health Focus, Meeting 1, Jan 21-22, 2009
Meeting Minutes Synopsis

Introduction and need for a collaborative forest health workgroup

- Restoring fire-adapted ecosystem (concentrating on ponderosa pine forest)
- Address elevated risks of uncharacteristic fire
- Develop a list of prioritized landscapes; "Where to go"
- Identify actions to implement in those prioritized landscapes; "What to do"
- Build from past collaborative processes and agreements

Participants (see list of attendees)

- Affiliation
- Interest in the KFHF process

Getting started

- Group agrees to proposed ground rules (see below)
- Main contacts are Jill Rundall of ForestERA (Jill.Rundall@nau.edu; 928-523-4730) and Ariel Leonard of KNF (aleonard@fs.fed.us; 928-635-8283)
- Structure of the group involves an inner circle of working group members driving the process, and wider circle of participants observing the process and providing periodic input
- Participants that have been involved in similar prior processes are asked to help get others up to speed
- As we move forward, participants are asked to continue communicating with external constituents and publics to develop a broader support system for the KFHF process
- Comment forms will be used to incorporate discussion into process
- Forest Service (FS) and ForestERA specialists are here as technical resources as needed
- The group will define consensus as the process progresses, identifying points or areas of agreement and disagreement.
- Usefulness of this process ultimately lies with the FS Line Officers (District Rangers and Forest Supervisor), but the intent is to try to implement what the focus group comes up with. The rate of project implementation is limited by agency capacity (people and funds), but knowing this will help the focus group prioritize landscapes and actions.

Review of previous related processes

- Western Mogollon Plateau Adaptive Landscape Assessment, 2004 (WMPALA)- forest data used in this project includes the Williams Ranger District
- Arizona Statewide Strategy, 2008- includes recommendations for KNF, and prioritizes the North Kaibab for wildland approaches to fire management and forest restoration
- Analysis of Small-diameter Wood Supply in Northern Arizona, 2008 (Wood Supply)- forest data used in the project includes the Williams and Tusayan Ranger Districts

These earlier collaborative efforts coarsely identified high-risk and high-importance areas across forested landscapes in northern Arizona, but did not give specific enough information for project level implementation. This forest health focus process is meant to inform the next steps taken by the KNF to implement projects on the ground.

Expectations for KFHF

The KNF expects the focus group to identify possible treatment practices and priority areas for treatment in each of the three districts. It is possible that treatment areas and activities agreed on by the focus group may lead into proposed actions in the NEPA process. Points of disagreement may result in alternative actions.

The KNF is also currently revising its land management plan (Forest Plan), and we expect to use focus group information to develop plan components, goals, objectives, and/or guidelines.

Collaborators expect the KFHF process to be iterative.

Collaborators agree that if issues are encountered that are particularly complex, contentious, or otherwise not suitable to discuss in the compressed timeframe of the four main meetings, self-appointed sub-groups may be formed to clarify the points and bring them back to the entire group.

Collaborators agree to use the consensus points formulated in the previous related processes (WMPALA and Wood Supply) in the KFHF process. ForestERA will provide a summary of these agreements at the next meeting, and the group will continue to look at areas of agreement as they progress.

What will success look like?

There are several perspectives of success:

- Identify several projects that specify location, acceptable activities, and what the treated area might look like after implementation.
- Identify the top priorities and sequence in which projects or segments of the landscape should be treated.
- Identify different scales of planning, within the entire KNF, within smaller segments referred to as Landscape Units (LU; 10K-15K ac), and even finer-scale project areas.
- Develop focus group products that are adaptive to changing conditions on the ground; either in response to unforeseen events, or in response to the implementation process itself.
- Economic opportunities (i.e., sale of small-diameter wood) must also figure into the development of appropriate project activities and prioritizing landscape units.

Concerns/Issues

Individuals in the entire group voiced their particular concerns and issues they thought were relevant to the KFHF process. ForestERA and KNF personnel responded to each point in a summary document that will be presented at the second meeting on 18-19 Feb. 2009.

Available Data

The group has several different types of land data available for use (e.g., vegetation, fire, wildlife habitat, soil, slope, water, roads, infrastructure, etc.).

- Data used in the WMPALA project are older and limited to the Williams Ranger District, but more comprehensive.

- Data used in the Wood Supply Study are more recent and include the Williams and Tusayan Ranger Districts, but lack some types of information.
- Grand Canyon Trust (GCT) has developed data for the North Kaibab Ranger District in relation to the Kane and 2-Mile Ranch projects. Includes information on forest composition and structure; fire hazard, behavior, and risk; and cheat grass occurrence.

Collaborators agreed to use the most recent data available, and re-run the analyses from WMPALA with the newer Wood Supply data. On the NKRD, the GCT data can be used to fill in the gaps.

Collaborators agreed to start with the Williams Ranger District, since it has the most data available. The Tusayan Ranger District can then be quickly addressed, and finally, the North Kaibab Ranger District. Each district will be analyzed separately, allowing for independent landscape prioritization within each district.

Action Items

- ForestERA develop a short synopsis of what was done before and data sets that support it (bring to second meeting, 18-19 Feb. 2009).
- Forest ERA and FS will keep a list of what issues have been dealt with and how, and issues not dealt with and why.
- ForestERA can set a time to go thru data in detail with anyone who would like to see the layers and get into details (scheduled 13 Feb. 2009).
- All should read reports for WMPALA, Gov Health Council and Small Diameter Wood Report.
- For any agreements that group wants to adopt, we get these articulated and move on. The FS and ForestERA will try to get this out prior to the next meeting so that people can review it.
- Allow participants to feed an issue to ForestERA team over next couple of weeks. It is important to get these on the table as soon as possible.
- Ethan suggested the need for an explicit road map of what we will accomplish in the next meeting; perhaps a small steering committee could help get an action plan developed.
- Agreement about starting with Williams Ranger District, using the most recent data available. Want to make sure that we get thru Williams RD and on to other districts by meeting 2 and meeting 3.
- Jill can help by keeping a list of the information that we need for the subsequent analyses on the Tusayan and North Kaibab Ranger Districts.
- Analyses will incorporate projects planned, in process, or completed since 2006. Prioritization should include areas that have been treated, however the group may still want to prioritize maintenance treatments versus areas where first-entry treatment is needed.
- See the ForestERA website for this and other information regarding the KFHF process, **http://www.forestera.nau.edu/**.

Kaibab Forest Health Focus Ground Rules

- Respect the opinions, beliefs and perspectives of others.
- Be candid with your knowledge, values and opinions.
- Allow the ideas of other group members to be expressed without interruptions.
- Listen carefully and ask questions to understand or clarify the ideas and views of others.
- Try not to force your ideas on others; rather, explain why you believe in them.
- Please keep your comments short and to the point.
- Focus on concerns and interests rather than positions.
- Focus on future improvements.
- Commit to giving the process a chance to succeed.
- Allow your facilitator to keep everyone on schedule and following the agenda.

Kaibab Forest Health Focus
Meeting 2
February 18, 1-5 pm and February 19, 8:30 am-12 pm, 2009
Northern Arizona University, Flagstaff
Applied Research and Development Building, "Large Pod" Meeting Room

Day 1 – 18 February: Focus on the Williams and Tusayan Ranger Districts

1:00 – 1:10 pm	Introduction/Objectives/Ground Rules
1:10-1:15 pm	Final KFHF Report Outline
1:15-1:30 pm	USFS Perspective on final products and utility
1:30– 1:45 pm	Addressing critical issues raised in Meeting 1
1:45 – 2:00 pm	Review of prior ForestERA agreements
2:00 – 3:00 pm	Williams & Tusayan Prioritization Proposal and Discussion
3:00-3:15 pm	Break
3:15-3:25 pm	Overview of potential treatment models on the Williams & Tusayan districts
3:25-4:50pm	Additional Data Availability and Analysis
4:50-5:10 pm	Comments from the Monitors
5:10 pm	Wrap-up and Adjourn
6:30 pm	Informal Social at Beaver Street Brewery

Day 2 – 19 February: Focus on the North Kaibab Ranger District

8:00 – 8:30 am	Coffee and Bagels
8:30 – 8:35 am	Welcome and clarification of today's objectives (Erik)
8:35—8:55 am	Guidance for Priority breakout workgroup
8:55 – 9:50 am	Guidance for Treatment breakout workgroup
9:50 – 10:00 am	Break
10:00 – 10:30 am	Unique characteristics of North Kaibab Ranger District
10:30 – 11:10 am	Data availability on N. Kaibab RD for prioritization
11:10 – 11:20 am	Identify values and risks used to guide analysis on NKRD
11:20 – 11:40 am	Breakout workgroup guidance
11:40 – 12:00 pm	Comments from the Monitors
12:00 pm	Wrap-up and Adjourn

Kaibab Forest Health Focus, Meeting 2, Feb 18-99, 2009
Meeting Minutes

Welcome and introductions

See participant list for attendees and affiliations.

Meeting 2 objectives:

1) Prioritize areas of importance within each ranger district (RD),
2) Determine criteria for treatment types,
3) Discuss any refinements in prioritization or treatments.
4) First look at Williams RD and Tusayan RD, then consider North Kaibab RD to come up with strategy.

Went over the 4 levels of support in making decisions: Group agreed to use this system.

1) I can easily support the action/decision
2) I can support but may not be a preference
3) I can support with minor changes
4) I can't support without major changes

Getting to the final product

The group received a new KFHF process map handout (available on ForestERA website).

Possible outline for the final report

(This powerpoint will be posted to website):

1) **Introduction** - nature of focus landscape approach, Collaboration, Science based;
2) **Purpose and Objectives, Study Region**,
3) **Methods** – review of basics of collaboration, science based landscape assessments,
4) **Results** – presented by district, map products showing prioritization and statements of agreements, treatment scenarios with description of outcomes and how consensus was agreed upon, and a statement of agreement;
5) **Summary Statistics** – tabular data to display the range of outcomes;
6) **Other issues** – statements of agreements, issues not addressed that are in need of future attention;
7) **Discussion** – synopsis of group consensus, results, implications for future management, and next steps.

Forest Service perspective of the final product and its utility

The FS is looking for a product (or products) that will directly inform project development. Ideally, the KFHF process will identify desired outcomes, identify treatment options to create those desired outcomes, and discuss associated issues.

- Ideas with strong agreement within the entire group will move forward into a project-level NEPA process; may even draft something as specific as a proposed action, provided group agreement is sufficient. Ideas with less agreement may need more site-specific information, and may be used to develop project alternatives.
- FS will also use information from KFHF process to inform desired conditions and objectives in the forest plan revision process, but the two processes are independent.
- The KFHF process will be slightly different among the different RDs; Williams has done a lot of work to prioritize treatment areas, whereas the North Kaibab has very few priority areas identified.

Potential Stopper Issues

Key issues that ForestERA thought the group needed to discuss further. Tom stressed that the purpose of looking at these is to see if we can find a path forward, and not let these issues stop the group's progress.

Desired conditions

- To minimize confusion with terminology used in other processes (e.g., WMPALA, Forest Plan, etc.), the KFHF group will concentrate on "post-treatment conditions." The post-treatment conditions may be used to describe the overall desired conditions needed for projects or plan revision.
- Post-treatment conditions should be explicitly articulated, and identify basic treatments within a range (X to Z ac of mechanical thin, fire, etc.), but not prescribe details of implementation.
- Monitoring plans may play a part in determining if projects achieved their goals.

Climate change

The group acknowledges that climate change will be a factor in future forest conditions and management. Models predict AZ will be hotter and drier, which could impact drought, fire, and insect cycles, subsequent tree mortality, and other unanticipated factors. The group also discussed the uncertainty of predictions, and the importance of cautiously interpreting models and devising management. A broad array of management approaches should be considered, focusing on a 5-10 year timeline. Monitoring and adaptive management will be helpful. It is important to keep our minds open and to use the expertise within the group.

Sustainability of treatments

- Treatment intensity may need to be fairly aggressive in some situations, but should use a full spectrum of treatment intensities across the landscape
- Role of fire in ecosystems should be restored to the extent possible
- Long-term objectives (e.g., 20 yrs) figure into the thoroughness of treatments and frequency of re-entry; want to minimize frequent mechanical re-entry
- Sustainability and resiliency of treatments must be considered at landscape scale, not stand scale
- Smoke impacts will need to be considered

Large trees and diameter caps

- Most stakeholders agree that there are too few large mature trees.
- Diameter caps are easy to understand and monitor, but may not be able to reach sustainable or restoration conditions with a diameter cap
- The primary issue is to determine what sort of thinning will be able to best address the issue of unnaturally severe fire
- However, there are social as well as ecological considerations, and social values drive this topic
- May be more effective to focus on post-treatment conditions and discuss management to get there
- Need to determine the size classes that exist, and agree on a size class distribution
- Develop some "if-then" scenarios for specific situations like insect/disease, WUI/non-WUI
- It should not be perceived that industry has desire to cut big trees. Our desire is to operate between 9 and 12 inches.

Other issues not reviewed in Meeting 2

In Meeting 1, the group identified several more potential issues, but these were addressed by ForestERA in 3 documents available on the website. Any other concerns can be addressed via email.

Also, instead of reviewing previous agreements (Statewide Strategy, WMPALA, and Wood Supply), the group was asked again to review those documents outside the meeting.

Discussion of Williams and Tusayan RD's.

To provide a starting point for KFHF discussions, ForestERA drafted a proposed prioritization map (based on values and risks) for Williams and Tusayan RDs using the WMPALA process with updated data. This map was presented to the group for comments.

Analysis results with new data

The items selected to represent values were:

- Human Communities and Infrastructure (buffered at 1.5 mi),
- Biodiversity (protect large trees – used MSO PAC's and goshawk PFA, vegetation diversity, focal habitat),
- Aquatic Systems (streams, lakes, springs), and
- Municipal Watersheds.

The risks identified were:

- Fire hazard (intensity)
- Fire risks (the chance of a large fire in a given area)

Group reaction to ForestERA proposed maps

The group pointed out several characteristics that were not included in the proposed priority map; ForestERA agreed to include these if the data could be found and was adequate. The group discussed modeling for fire hazard and fire risk, and discussed other risks that might be identified (if there is data available to represent these).
Areas of high value and high risk (i.e., high priority) are the places we want to focus the attention. Some areas are currently being treated, or are approved for treatment, under existing FS projects. The RDs will need to provide those current polygons to ForestERA so the group can properly consider these.
The group was not comfortable using the proposed ForestERA map to assign priority areas. The group thought that some important data layers were not included in the proposed priority map, and more detailed discussion was needed to adequately determine priorities. It was agreed that sub-groups address these concerns, and develop treatment options outside Meeting 2.

Ed Smith presented information that The Nature Conservancy developed about recent climate change, moisture stress analysis, and conservation priorities in New Mexico. It showed that the higher elevation areas have shown most departure from historic trends. Information from several TNC projects was made available to anyone in the group that wanted it.

ForestERA made a request for spatial data to address the information the group thought was missing. Then the sub-groups can check the updated maps and devise some priorities and treatment options and draw some "soft boundaries".

[Day Two, February 20] Proposal for today is to look at a couple of small group processes to develop prioritized areas and treatments, and talk about prioritization and values/risks

pertaining to North Kaibab RD (NKRD). Also want to talk about soft boundaries for priorities and treatments. At break we'd like to identify a small group who will work on prioritization and a small group to work on treatments.

Guidance for Prioritization and Treatment Sub-groups

- Any organizations that provide new data to ForestERA will need to have data in a spatial format, and they need to be continuous across the planning area. If they aren't, these are not useful and bias the process.
- Both groups will need to look at all three districts, because they may decide criteria are different on each district.
- This process is not constricted by laws, regulations, etc. that would come in during actual project analysis. We are trying to provide tools to look at issues so that there is more openness about treatment considerations.
- It's important to identify areas of group concordance as well as areas where the group does not reach concordance about the priorities and treatments.

Prioritization Sub-group

We're proposing two ways to move forward:

1. Black Box – there are analytical approaches to take data and generate in an objective way to determine what the three priority areas are. We don't have a recipe, but there are tools available to do this type of work.
2. Democratic approach – ask participants to take a pen and delineate on the map what areas you want to see prioritized. We can look at the majority or integrate these into a consensus. If you delineate, put on your name and thoughts about why you chose these. ForestERA will use this guidance before next meeting.

Treatments Sub-group

We can send out a matrix of where and why and ask each person to fill it out. There are two aspects of process: the values/risks and the treatments. Prioritization identified values (landscape features) and risks and aggregated these into priorities. Second part is which actions to take and where. We want place-specific recommendations and to consider how treatments will achieve objectives of reducing risk of undesirable fire and returning desirable fire, and so on. We want guidance for how management actions will be allocated across the priority landscapes. This will help to guide future planning and action.

ForestERA consulted with a lot of "experts" to understand what reasonable treatments might be. An appropriate set of treatments need to be relatively simple and easy to apply. If we get too prescriptive, the treatments may tie hands of managers. To the extent that future projects are consistent, there should be consensus, to the extent that they deviate, there will be conflict. Need to have in-depth discussion specific to KFHF, but this is also the product of other meetings. We may want to make some changes or adjustments.

Five treatment alternatives for ponderosa pine include:

1. High intensity thin and light burn
2. Intermediate intensity thin and light burn
3. Low intensity thin and light burn
4. Heavy burn only
5. Light burn only.

Treatments for mixed conifer:

1. High
2. Moderate

3. Low

- Assigning treatments is independent from priorities.
- There are constraints to take into account - for example, PACs and WUI. Even within these, some PACs can be split into low intensity and those with no treatment.
- Final aggregate is what treatments and where these would occur.

Discussion of North Kaibab Ranger District

The NKRD warrants special consideration because it was not included in the WMPALA or Wood Supply processes, and it is physically and socially different from the Williams and Tusayan RDs.

North Kaibab Ranger District Unique Characteristics

The group generated a long list of social and environmental characteristics that differentiate the NKRD from the South Zone districts (Williams and Tusayan). These characteristics warrant consideration to determine if/how the NKRD priorities and treatments might differ from the South Zone.

Data Available for NKRD

Brett Dickson presented spatial data provided by Grand Canyon Trust (GCT) for the NKRD. Data include information about the Kaibab Plateau in Grand Canyon National Park as well. Group agreed to include GCNP data to extent that is possible and that it doesn't slow this process.

Jill led a brainstorm session about what sort of mappable information the group wanted to use while evaluating priorities and treatments on each district:

The group looked at Values and Risks criteria identified for Williams and Tusayan, and decided if they work for the NKRD. (See ForestERA website for official copy of this table).

Sub-group tasks

- FS/ForestERA will provide both groups with some specific written direction and additional details (from agenda that we didn't get to).
- Try to get all items needed worked out in one meeting.
- Have information ready to post for review prior to Meeting 3.
- Need Prioritization first, then Treatments.
- Meet within the next 3 weeks.
- Ethan will send out a Doodle message to schedule both groups.

Both groups need to devise:

1. Criteria for all 3 districts
2. Approaches or scenarios including scales

Individuals signed up for one or both of the Prioritization and Treatment sub-groups, and agreed to meet within the next 3 weeks.

Because GIS analyses take time, the sub-groups must provide decision information to ForestERA in a timely fashion. Coordinate with Jill.

The KNF thanked the group for their time and effort, asked everyone to do the best work possible in the fixed time allowed. The information the group provides will provide valuable general guidance for the KNF.

Kaibab Forest Health Focus
Meeting 3
April 28, 1-5 pm and April 29, 8:30 am-12 pm, 2009
Northern Arizona University, Flagstaff
Applied Research and Development Building, "Large Pod" Meeting Room

Objectives

- Review workgroup outputs and preliminary Forestera products
- Refine prioritized areas and treatment guidance
- Move toward consensus on priority areas and treatment guidance
- Refine report scope and define write-up responsibilities

Day 1 – 28 April—Sharing Analysis

1:00 – 1:15 pm	Introduction/Objectives/Ground Rules
1:15– 3:00 pm	Draft Prioritization Results
3:00-3:10 pm	Break
3:10-4:50 pm	Draft Treatment Results
4:50-5:00 pm	Comments from the Monitors
5:00-5:10 pm	Wrap-up and Adjourn
6:30 pm	Informal Gathering

Day 2 – 29 April—Refining Results

8:00 – 8:30 am	Coffee and Bagels
8:30 – 8:35 am	Welcome/Objectives
8:35—9:45 am	Refining Prioritization
9:45-9:55 am	Break
9:55- 11:30 am	Refining Treatment Guidance
11:30-11:50 am	Clarification on Next steps
11:50-12:00	Comments from the Monitors
12:00 pm	Wrap-up and Adjourn

Kaibab Forest Health Focus, Meeting 3, April 28-29, 2009
Meeting Minutes

Eric went over agenda for this afternoon.

1. Draft Prioritization Results
2. Draft Treatment Results
3. Monitor Concepts

Tom Sisk: We have worked thru a lot of information and discussion to get to prioritizations and treatments. We have work to do to refine the results and determine where we have consensus. We also can think about how this will inform forest planning and the larger treatment efforts.

We have the overall KNF, we moved to the District level. With data refinement, we have gotten to prioritization at the sub-district level, and are getting to guidance for treatments. We are not going to the project planning level in this process, that is a different process that necessarily requires more detailed data than we have available, as well as field verification.

The Four-Forest Restoration Initiative is above the forest level, we are not dealing with it here. Our work here will be relevant to the Initiative, but there isn't enough information known yet to get into discussion of it.

We were originally thinking about 2-3 areas of about 15,000 acres each. The Working Groups gave us more than that, so one task we have ahead is to rank the prioritization areas.

Jill: This will be the second prioritization for Williams and Tusayan Districts; it will be the first for the North Kaibab District. We decided to form Working Groups had meetings to get into more detail. We met twice. The Working Group meeting attendees are listed on the Working Group Outputs table.

<u>North Kaibab Prioritization</u>
Two areas constrained included Warm Fire and Jacob Ryan Project area. Three areas included – DeMotte Park, Big Springs, and Jacob Lake. There are differences among the landscapes. North Canyon also came out as important. There was also interest in cross-jurisdiction areas with Grand Canyon National Park-Forest boundary. The mixed conifer area largely dropped out, emphasis was on ponderosa pine. DeMotte was a community protection area. North Canyon was a priority because of need to protect TES. The group next looked at active crown fire area the west side of the district and park-forest boundary.

5th Code Watersheds provided a pretty good break. There was a request for some sequencing in the west ponderosa pine. There is the North Canyon, Park-Forest boundary and DeMotte urban area, west ponderosa pine moving from south to north. There is some mixed conifer in the ecotones.

The size of areas ranges from 5,000 to 20,000 acres.

Angela suggested that we remove DeMotte Park community protection area since the district is currently working on a proposed action for these areas.

Jim M - suggested that we might want to start on east side including pinyon-juniper. We can pretty much start anywhere; it all needs to be treated. We see the Jacob-Ryan project occupying the existing capacity for several years (five years).

Tom S. - we want to try to focus on the next project area and which it should be. There is some indication that we may be some ability to move faster in the future.

Work Group – Ethan described discussion about ponderosa pine across the area. There was the most agreement on ponderosa pine. There was more disagreement on the mixed conifer. There is a need to do something about mixed conifer. In North Canyon agreement on starting small and looking into management here there might be able to be some agreement about the kinds of treatment. Also need to look at discontinuity of management along Park-Forest boundary. There wasn't as much agreement on treatments, but more discussion bout the need to coordinate management among agencies. Discussion about west side focused on the fact that there were more acres on the west than east side ponderosa pine. Realize that the Warm Fire didn't follow the typical s/se wind direction. Still some thought to prioritize the west side ponderosa pine higher than east side.

Jim K. – there are about 100,000 acres of mixed conifer on North Kaibab Ranger District, it isn't in a condition that you want. Someone needs to get started on it. North Canyon would potentially kill two birds with one stone. Need to think about where we would get best benefits with least cost.

*Grad Student - There is an area on the south side near Park boundary that has already burned. There may not be much fuel left in that area.

Bill A. – Is there mixed conifer in some of that west pine? How much did you buffer the Park side?

*Tom S. – We would probably want to consider how to deal with mixed conifer that occurs within the ponderosa pine.

Jill: on south side 1 mile buffer and the Fire Point road was used as the dividing line on the west.

Ethan: I think the maps provide a good representation of what the Working Group came up with.

Jim M. If Jacob-Ryan is appealed or litigated, would we consider that area still?

<u>Williams</u>
Near the end of the first Working Group meeting, it was determined there was a lot of completed NEPA. We needed that info so that it would help refine the data. What is shown is 1) community protection zones – Parks and Williams. In the Williams area, used the Williams watershed, for Parks, the Wood Supply info was used to provide a larger area. Areas of general private land were lower priority than the community protection area. Areas of MC were delineated, and ponderosa pine around the mountain tops look like donuts (Bill Williams, Kendrick, Sitgreaves) was ranked as medium. Sycamore area has a lot of pine-oak as well as concern about fires coming up from that area. This was provided a medium rank. Low priority was the west Sycamore area. High priority areas (mountain donuts) were 15-20,000 acres, and medium (Sycamore east) were also. NEPA planned and completed removed.

Pascal: For treatment is it important to include the NEPA planned. There would potentially be area where treatment could occur?

Mark: Some of the area has already been sold.

Jill: Don't have the detailed info on NEPA completed, but unsold. So we took all the NEPA planned and completed off the table.

Ariel: I think that some NEPA-not-treated areas could be lumped into the prioritization areas, but this would be beyond the scope of this project.

Jill: Community protection zones include not only the designated areas, but also any private land and utility corridors.

*Bruce: Does seeing the NEPA areas change any of the prioritization thinking?

Tusayan
Priorities based on high active crown fire. Community protection zones have already been planned and treated. Includes the Coconino Rim west. This area is large; there was a suggestion to split this into 6th level watersheds which makes 2 areas of about the 15-20,000 acre size. GC Game Preserve is right along the Park boundary.

Holly: suggest that boundaries be set by easily locatable landmarks such as roads rather than watershed boundaries.

Tom: These are good refinements that will help make these more practical. Please record on the sheet.

Ariel: Want to have agreement from Small Groups about the work Jill has done, and want to make sure there is understanding among the whole group.

Holly: If these areas were treated on Tusayan, this would allow us to manage fires for resource benefits without suppression activities. We have already been able to do this on the areas south.

*Park-Forest boundary treatments not as much discussion about cross-jurisdiction on south Kaibab.

Ariel: Introduced Christine Dawe, Regional Planner. The Comprehensive Evaluation Report is completed, and will be posted to the website very soon. Passed around a sign-up sheet for electronic copies/CD's ahead of the posting.

Treatments
Jill will go over the spatial information by District. Ask that you add comments from Working Groups. Approaches for each district are different. There was more site specific consideration in this effort than many of the previous processes that ForestERA has worked on. It has added a lot of richness to the process.

North Kaibab
Treatments should align with priority areas. Group guidance was coarse, it was based on special areas such as MSO pacs were buffered ¼ mile but will receive some treatment, Goshawk PFA buffer ¼ mile but will be treated , cultural sites, >40% slopes, sensitive soils, riparian, etc (see notes on table). NEPA completed areas were removed. There is no mechanical treatment and no treatment. No mechanical treatment included wilderness, sensitive soils, riparian areas ¼ mile buffers, and special designations. No treatment in this process may change somewhat at the project planning level. This is treatment guidance that will help guide project implementation, but is not constraining. ML 3,4,5 roads buffered for safety.

*Goshawk treatments

Treatment types are heavy thin, light-moderate, no mechanical, no treatment. MC no treatment agreed upon. The rest of the area had agreement to generally treat to move from active crown fire to passive crown fire (surface fire).

Ariel: Realize the MC is controversial. We may need to have a subsequent process to address this.

Tom: We need to try to come up with some treatments that might be acceptable, would prefer to not leave this out.

Jim M. – Area within the wilderness boundary. There is some limited treatment along the stream for some cooperative work that is occurring.

Sarah: *Are you going to post draft maps on website?

Tom: Need to be a little careful because different versions can be confusing. We are willing to have a few maps available to review tomorrow.

Jim M: Are we talking about specific treatment kinds, helicopters versus horses?

Tom S: That is too specific. *The areas that have shown reduce from high crown fire risk to passive crown fire may be important to discuss and clarify.

<u>Williams</u>
We are looking at the same prioritization areas and same data layers as used before. There are some places where the high cultural site density shows up.

Holly: was the road buffering specific to NKRD?

Jill: that appears to be the group consensus.

Bill: We didn't talk about the Sycamore area. Is there representation of pine-oak in this area? *What happened to the MSO habitat? It doesn't seem like it was picked up in the data layers.

Holly: I think it was designated because it was a fuel optimization area where there was high active crown fire. It probably has 1/3 to ½ of the pine-oak on the district. *Mark Finney looked at this as a staggered (herring bone pattern) fire approach.

Tom S: The idea is to slow down an active fire. The question is how this should be used? Would it actually work as a management tool (fire only)? Some of the WMPALA process included a demonstration of this. I am uncomfortable with using this.

Bill: I think this would be an approach that I'd like to look at for MSO habitat management.

Tom: This suggests "controlled" fire, but in execution it may not be possible. Need to be cautious of what we would be getting.

Jim M: What would happen if you didn't use the herring bone pattern?

Tom: I think this was identified as a large area, but we need to give this further discussion.

Tusayan
Three treatments: no treatment, heavy thin along roads.

Holly: Layers with active crown fire to surface fire doesn't appear to be included. I'm not sure the roads buffer should be applied to Tusayan either.

Bill: Coconino Rim has some special values. Back off the intensity of the treatments on SW side versus treatments in the area.

Tom: We may not have given the same level of thinking to Tusayan District.

Bruce: There heritage site density is a project level consideration. There may be mitigations related to treatments, but it is probably too detailed.

Tom: Want to give some process for tomorrow for refining the data. We are assuming that people may want to spend more time on the treatment versus prioritization. We think much of the work has been completed, but that we are refining some details. Two potential approaches are criteria based and location based. We may use both of these to make some advances. We can do some real-time analysis. Hope to come out a step ahead that we can do tomorrow, and there may be some things that we need to do between meetings.

Tomorrow we want to start at prioritization- we could work on the maps looking at place specific items that can be considered for treatment or removed. We could also look at the table that Jill developed; we can make adjustments in the criteria and then project these across the District/Forest.

On the treatment level, there are a lot of things we can do. For example the areas along roads that have been identified for heavy thin, we may decide this is too large a buffer or too small a buffer. We can re-project it. In the MC, it would be good to make some headway to look at a couple of steps further. For example higher or lower elevation or some of the areas in the ecotones might have one treatment, the more pure MC, might have a different treatment.

Do we want to stick with this resolution or be more general in identifying treatment areas? What is the mapping area size that we want to depict? This may be dependent upon the discussion tomorrow. In previous meetings, I had envisioned larger or lumped areas. The concern is the amount of confidence we might have in this areas, such as the exact location of the ecotone. We need to represent these things in the most useful way.

At the final meeting there will be one more opportunity for a few adjustments.

Bruce: if we represent a range, it helps to capture the confidence.

Jim: What do you expect to provide to the FS?

Tom: We will provide the deliverables that had been agreed upon, but it has taken much more time than we expected. There will be some information available for future analysis. Want to be able to identify where the next projects and types of activities will take place on the forest. Help inform objectives and guidelines in forest plan revision.

Jim: How will you handle departures from this process?

Ariel: In forest planning, there are plan options. Tried to get a lot of the stakeholders to participate in this project. There may be departures, we'll be trying to use these as much as possible, but the Line Officer will have the final determination.

Eric: Any other comments?

Ethan: I imagine that we are going to have a very high level of consensus on prioritization, and perhaps less consensus on treatments. I think it is important to define the levels of agreement to the FS would be helpful.

Ariel: We can define the dissenting opinions, and where there was more agreement.

Tom: I'd like to see us get to agreement, at the expense of detail. I'd prefer to balance the agreements if possible. Let's not let the perfect be the enemy of the good.

April 29, 2009

Mikele: AZGFD offered expected species distribution across the state to see if it made sense to apply that data to this process. Most data layers appeared to be accurate, but there were some errors such as burrowing owl didn't show up, and red fox showed up on the North Kaibab which is wrong. It is based on re-GAP information. We concluded that it would be best to deal with wildlife in a narrative form that would make some recommendations about treatments in those areas. We didn't want to use AZGFD information to drive the process.

<u>North Kaibab</u>
The group identified 5 priority areas. Are there concerns about how the boundaries should be drawn?

Jim M – what is the next logical starting time for a vegetation management project?

Angela – probably start in 2010, implementation might be fall of 2010.

Bill A – I don't think the information that was shown was what the Working Group decided upon. I don't think there was discussion about the ecotone. If it is going to include mixed conifer, I don't think there will be consensus. One recommendation would be to go back to ponderosa pine only. I think that the western ponderosa pine area was looked at as one area, this dividing up into several areas, and starting at the south is different. We didn't have consensus on the North Canyon treatments. I think the treatments should be limited to above the rim to the south; not the canyon itself. There has been discussion that there would be no mechanical treatments in the canyon, but there would be fire treatments, and that is concerning without mechanical treatments.

Tom – Are you asking to reopen the discussion about what the results of the working group were?
Bill A – I am trying to clarify the outcomes of the working group.

Ethan – My sense of the meeting yesterday was that we would continue to discuss the topic today.

Eric – Lets take these topics on one at a time.

Ethan – My recollection about the discussion was that there were comments made about the ecotone, however there was not consensus about how to deal with that. I don't think we should exclude mixed conifer, but I think it is important to separate the discussions about priorities versus treatments. We didn't find consensus on mixed conifer in the working groups.

Ariel – the objectives for yesterday was to go over the working group results and verification of these with the larger group.

Pascal – I have seen a lot of good faith communication that I think there was a miscommunication. Let's turn the page and move forward. It is the best use of our time. If the question is mixed conifer then let's address it.

Bruce – we drew the boundaries that included mixed conifer. There is some overlap in the park-forest boundary and the western pine area that needs to be dealt with. Bill did accurately describe his concerns with the North Canyon area.

Eric – Can we finish describing the west side ponderosa pine?

Ethan – The conversation about the area was about ponderosa pine dominated areas. There is a valid disagreement within the group about mixed conifer. We didn't draw the boundary to exclude mixed conifer. I think there is agreement about treatment of the ponderosa pine, there is disagreement about treatment of mixed conifer in the ecotone areas. A narrative description about this is important to point this out. There is value in treating the west side ponderosa pine belt. The sequencing was an effort to provide more tactical direction to the Forest Service, but the intent was to treat this area in a contiguous fashion with a broader landscape. I don't remember clear discussion about the park-forest boundary area.

Tom – it seems like we can easily depict the western ponderosa pine band versus the park-forest boundary.

Bill – I think that we just need to consider these; the issue may be the ranking of the areas.

Bill – I think that the idea was to have the boundary include the mixed conifer, and to treat it, but there wasn't agreement on the treatments. I think we are trying to rank the priority of these areas.

Tom – Do you have a suggestion for rank?
Bill – I think the west side ponderosa pine is the top rank, and the park-forest area is second. Third priority is North Canyon.

Pascal – there was discussion about consistency of area, I think that was why there was discussion about breaking the large polygon west side ponderosa pine into smaller pieces. I wrote down that we had a clear consensus that North Canyon was #1, west side ponderosa pine was #2. The question seems to be including treatment for the mixed conifer? I think Jill has accurately captured the information. I think we can change the areas. Let's move on to get this figured out. I am concerned about the size of the west side polygon.

Bill – I was trying to represent what came out of the working group, there was more accuracy about some things than others.

Eric – I need a concrete proposal for how to move thru this?

Ariel – we need to remember the objectives of this process. We need to identify 3 areas, and rank these.

Tom – I'll draw a map so that we can be clear about what we are discussing: #1 is the west side ponderosa pine, including the entire polygon. #1a is the south, #1b is the center, and #1c is the farthest north area. #2 is the Park-Forest boundary polygon, and #3 is North Canyon.

Ethan – We need to document that the group recognizes the importance of treating the entire west side ponderosa area. We discussed sequencing and based on the prevailing winds. I think the area needs to be treated contiguously. The area along the border was discussed not so much as a treatment priority, but as a need for coordination between agencies and that there was a need for additional work to make this happen as soon as possible. For North Canyon, some people want to address the whole area, others don't. My preference would be that we treat areas #1 and #3. I think we should pull #2 out. I think #1 can be sequenced, but I don't really care how that happens.

Bill – What is your highest priority polygon?

Ethan – My rank would be #3, #1a and #1b.

Holly – My priority is #3 North Canyon, and I think it is the most critical because there has been less treatment. #2 next and #1 would be the third. North Canyon has not received treatment, and it has the greatest risk. The Park-Forest boundary has only had limited treatments. The west pine area has been the center of treatment and retreatment. In terms of fire behavior, we are getting a lot of column dominated fires on the North Kaibab versus wind driven.

Ariel – Could we include #2 in #1 with the comment that we need to coordinate with the Park on the boundary area? For me, #3 is the first priority; it came out as one of the highest ecological value areas and is at high risk. For me I would include all of #3 and first priority would be the rim area.

Tom – What does #3 include? Is it the whole canyon or just the rim for prioritization?

Pascal – We had some agreement that the entire area was a unit.

Bill – there was no agreement on treatment.

Jim M – Jim Koons and I didn't realize there had been a subsequent meeting. I think the rank should be #3, #2, #1. We are out on the ground every year so we are very familiar with the conditions on the ground.

Kim – we are factoring in the wilderness designation? Yes

Tom – I suggest that the entire #3 could be prioritized, it doesn't relate to treatments. At this time I don't think there is agreement about the whole area versus the area south of the rim.

Ethan – When you talk about priorities, this probably relates to a project boundary. So there is tension surrounding this because of that assumption. Perhaps some discussion of treatment might help clear this up.

Tom – I am trying to look at a way to get this figured out, is it best to talk about treatment in conjunction with priority. This does make the conversation more complex.

Eric – What about #2?

Pascal – I think that there is continuity between #1a and #2. I anticipate the discussion would continue to the Park, but we don't know how the Park will do. It seems beyond the scope of this process. Maybe we shouldn't get tangled up in that. For me #3 is the top priority, and then merge #1a and #2.

Kim – I support the idea that the agencies work together, and the Park needs to be engaged in this.

Bill – I think there was a distinction between west ponderosa pine (#1), and the Park-Forest boundary (#2).

Tom – If the ponderosa pine portion of #2 is included in #1 will this work?

Ethan – Are we talking treatments or coordination?

Holly – Remember that fire management is now combined between the Park and the Forest. Coordination of treatments is now happening.

Bill – I thought #2 was a coordination issue with the Park, with the assumption that the Forest would treat their portion. I think the boundary includes pine and mixed conifer.

Eric – Is there complete consensus on the rim portion of #3?

Angela – I think there is importance to prioritize the entire area for need.

Eric – There is strong support for the rim portion of #3. Bill disagrees about treatment of the entire watershed.
Ethan – There seems to be clear agreement about #1. The Park-Forest boundary is dependent upon the Park.

Ariel – Martha Hahn did say she was interested in cross-boundary management. Can we include narrative about the need for this?

Eric – can we agree that #1 is separate, and #2 is dependent upon coordination with the Park.

Mark – Lets keep #1 separate, and have some narrative describing the opportunities for cooperation with the Park in that small polygon.

Bill - #2 includes treating everything, where #1 is pine.

Tom – I think we can present description about the overlap in these areas in the report. Brett Dickson will be sitting in for me for the last part of the meeting, and I also think it is important to characterize the sense of the group including agreement and disagreement. There seem to be two options –continue to try to resolve this or just document the degree of consensus. Let's try to capture the sense of the group and move on.

Eric – Lets review the treatment criteria developed for the areas and refinements of these.

<u>North Kaibab Treatments</u>

There is an area of moving from active crown fire to surface fire or passive crown fire, the remainder has varying levels of treatments based on the type of area.

Ethan – I think the intent was to allocate the mechanical treatments in order to be able to use fire safely. I think the red groups were undefined in terms of the types of treatment.

Jill – there were 1) no treatment areas, 2) MSO, 3) goshawk, 4) road buffer with heavy treatment ¼ mile on either side of the road, 5) treatment but not defined (active to passive crown fire), and 6) no mechanical treatment.

Ethan – road buffer didn't come out quite as I imagined. I wonder if it would be more appropriate to have a wide buffer on south and narrower buffer on north. I think there should be more continuity across the landscape.

Eric – I think the goshawk areas trumped the road buffer in the current map. Are there objections to Ethan's proposal?

Angela - Goshawk PFA's on the North Kaibab overlap and overlap with foraging areas. The PFA trumps the foraging areas because of the overlap. We don't buffer these, so I have heartburn about showing this. I think it is more useful to talk about Goshawk habitat as a whole because we don't have detailed information to discuss the types of treatments for nesting, post fledgling areas, and foraging areas this is discussed in projects.

Jim M – what are we talking about when we say buffers?

Eric – the working group said ¼ mile on either side of the road would receive heavy treatment. For the PFA we were talking about treatment on south side of them in a light to moderate treatment.

Pascal – Are the 3, 4, and 5 roads shown?

Ethan – When I look at the roads layer when there are high density areas, the treatments may need to be adjusted. I would want to have fairly contiguous treatments along the roads. The value seems to be in the narrative description of the values and concept behind the treatments. The maps are a visual depiction of the treatments.

Eric – moving to goshawk guidance.

Angela – lets use the PFA and not use the ¼ mile buffers.

Bill – I want to elaborate on the ¼ mile buffers. I think Jill tried to model this on the southwest sides of PFA and PAC's. It may depend on the fire behavior surrounding the area. I don't think a rule should be applied in all places. This is a site specific call.

Jill – we identified the high risk of fire behavior areas first, and then applied the buffer.

Eric – Can we include this in the narrative? Let's move to MSO critical habitat. We're removed mixed conifer from the west ponderosa pine area. We do need to discuss considerations for the mixed conifer?

Jay – primary constituent elements, need to avoid adverse.

Ariel – move from potential active crown fire to surface fire; reducing the potential for crown fire.

Mark – In that area it would be loss of dry mixed conifer especially the large ponderosa pines due to the high risk of crown fire. I want to retain the large tree component.

Holly – high severity fire would produce high sedimentation into the creek. We don't want a large runoff of ash into the creek.

Stacie – Sierra Club would probably want minimal treatment because it is controversial and there isn't consensus about how to treat it.

Steve – I think it is a good opportunity to figure out how to treat mixed conifer and this is a good area to do some adaptive management.

Angela – The Apache trout would be affected relating to the high sedimentation of a high severity fire occurrence.

Bill – Treatments in the area above the rim is good. Would need to follow guidance in MSO recovery plan, without that there wouldn't be consensus from FWS.

Jim K – protect water features that you have in that area. Water is a limiting factor on the North Kaibab.

Kim – there is an urgency in addressing the issue, but there are constraints. Use a precautionary approach and follow the laws.

Ethan – There is an opportunity to have a research design and multi-stakeholder monitoring process that allows us to take advantage of the opportunities.

Bruce – we are going to ask for funding to continue this process to discuss mixed conifer in North Canyon.

Eric - There is not consensus on treating mixed conifer, and the above concerns have been voiced surrounding this area.

Ethan – we haven't had discussion about strategically placed treatments across the landscape. I think these need to be captured in the narrative as an approach for the large areas farther away from these areas.

Bill – Are you suggesting that we include it even though we aren't getting into the details of how this would happen?

Ethan – I think this was an assumption that was made for the west side ponderosa pine.

Ariel – In thinking of applying it, there were places where it seemed like there were still vulnerable areas, those might be some places in need of more intensive treatments.

<u>Williams</u>
Priorities Refinements

Bruce – I wanted to clear about the mixed conifer polygons around the mountains. I think we suggested treatments around the base, but no treatments in the mixed conifer itself. No consensus about mixed conifer treatment.

Eric – the donuts around the mountains were about 20,000 acres. The two community protection areas were also about 20,000 acres. There are two areas near Sycamore Canyon (these were separated because of size), and the dispersed areas around private property.

Jim M – Is there anything going on with drought or insects that would drive treatments? Wouldn't slopes or elevations require more treatment.

Mark – we did have epidemic levels of ips kill and we lost a lot of large trees. We have a lot of treatment needs related to that. Within the white fir, we have lots a lot of trees to fir engraver.

Eric – do you have priorities?

Bill – how about community protection areas #1, donuts around mountains as #2, and Sycamore as #3 (both of the areas combined).

Treatment Refinements

Community protection areas – we wanted to move these from active crown fire to passive or surface.

Bill – I think we want to protect these areas as much as possible. Where there is MSO habitat, need to follow guidelines.

Eric – Jill had shown roads with buffering, do we need this?

Holly – I don't think that we need the differentiation.

Eric – We will remove the road buffers.

In the Mountain Donuts – NEPA, >40% slopes and species areas were removed.

Holly – I suggest removing the road layer.

Mark – were these heavy thinning treatments?

Eric – I don't think this was specified. What is the best approach here?

Holly – I think reducing from active to passive crown fire is a good start.

Jill – You can rank what is more important in terms of treatment in these areas.

Holly – Along those lines, we had discussed Heritage density could be moved to a lower layer.

Ariel – we have regular quarterly consultation with the tribes and cover projects that are proposed.

Sara (TNC): Should there be different treatments in the community protection zones be the same as the mountain donuts.

Holly – I envision that we would meet the goshawk guidelines, with community protection zones these might be toward the lower end, and mountain donuts might be more at the upper end.

Ethan – I think there are two different intents. What we are doing is trying to in the mountain donuts is to modify fire behavior so that we don't get the high intensity fires up into the higher elevation vegetation types. I think we are trying to restore systems, promote beneficial use of fire and reintroduction of fire. In community protection areas we are doing just that, protecting the community. I think we need to have narrative description for these objectives.

Ariel – if we can articulate clear objectives for these areas, these can more easily be pulled into the Forest Plan revision.

Pascal – From my perspective the objective in community protection areas is to bring the fire to the surface. I'm not as sure this is the objective in the mountain donuts. This would be the difference between the treatments.

Eric – in community protection areas, the objective is to move from active crown fire to surface fire. There is group consensus for this.

Jill – in the pine-oak layer for the Sycamore area, we used the PAC's themselves to define these. It might be good to add a criteria layer to refine this.

Pascal – we need to remember that the ecological unit is larger, we have removed the NEPA projects so there are some gaps in the area shown.

Holly – this was another area where we thought that treatment optimization would be a possibility across this area. We wouldn't treat the whole area, we would put in strategic treatments.

Bill – The recovery plan criteria should be followed. There are 4 different criteria that are covered in the recovery plan. The optimization approach would be appropriate here.

Ariel – As a result of the MSO habitat, it drives the location of the treatments.
Mark – Remember that if we always avoid the MSO areas, we leave them most vulnerable. I don't agree with altering the intensity of treatment based on the label, we need to be paying attention to the vegetation needs as well.

Bill – I don't think we're saying that MSO habitat is out of bounds.
<u>Tusayan</u>
Prioritization Refinements

Bruce – the road is back from the Coconino Rim. This area is an Inventoried Roadless Area.

Holly - FR 302 makes a logical break of the large polygon into two segments. I propose that the IRA be treated with fire only.

Eric – Do we want to buffer the road or just include the ponderosa pine?

Pascal – I suggest we stay in the ponderosa pine only.

Treatment Refinements

Jill - Currently have road buffer, high cultural density, and fire behavior. There weren't as many concerns about special areas such as slopes, etc.

Holly – Move from active crown fire to passive. Don't differential between buffered roads and other areas.

Ariel – we have been more successful at managing fires for resource benefit on the Tusayan District. Anything that would help us move in that direction over a greater area would be an important objective. "Increase the feasibility of managing fires for resource benefit."

Kim – The IRA has a lot of values and needs careful consideration. We do want to retain these values.

Mark – I think there is a community protection area in the northwestern side that probably does need to be treated.

Eric – I want to begin the wrap up.

- Make sure community areas have been treated – check on this.
- For some of the narrative descriptions, there seems to be a lot of interest. The NKRD Park-Forest area and North Canyon, For Williams need to distinguish between community protection areas and mountain donuts, and the Sycamore area MSO info.
- On the big issues list from previous meetings, Tom has tried to address these. A number were set aside, and we need to address these in narrative form.

Tom – issues list will be addressed, but we may need to contact individuals to help clarify these or provide input. Individuals who would like to actively participate in this, please stay afterwards. If there aren't volunteers, we'll try to address these.

Next meeting is June 2 and 3. ForestERA will clean up maps and will have a draft of the narrative information available. There will be some tabular data. ForestERA will have this available prior to the last

Kaibab Forest Health Focus
Meeting 4
June 2, 1-5 pm and June 3, 8:30 am-12 pm, 2009
Northern Arizona University, Flagstaff
Applied Research and Development Building, "Large Pod" Meeting Room

Objectives

- Review refinements to priority area and treatment maps
- Build consensus on priority areas for management attention and treatment guidance across all Kaibab Districts
- Refine key narrative descriptions of group intent
- Build consensus group statement
- Develop understanding of USFS use of products and next steps on Kaibab NF

Day 1 – June 2nd

1:00 – 1:05 pm	**Introduction/objectives/ground Rules**
1:05-1:15 pm	**USFS opening remarks on process**
1:15– 2:45 pm	**Review spatial representation of priority areas & treatments**
2:45-2:55 pm	**Break**
2:55-3:30 pm	**Review spatial representation of priority areas & treatments**
3:30-4:40 pm	**Small Group work: Refinement and validation**
4:40-4:50 pm	**Comments from monitors**
4:50-5:00 pm	**Wrap-up and adjourn**
5:30-8:00 pm	**Panel discussion "Breaking the Forest Gridlock" GCT** (optional)
8:00-9:00 pm	**Informal gathering**—Beaver Street Brewery (optional)

Day 2 – June 3rd

8:00 – 8:30 am	**Coffee and bagels**
8:30 – 8:35 am	**Welcome and clarification of today's objectives**
8:35-10:00 am	**Discussion of small group rankings & refinements: Assessing consensus**
10:00-10:10 am	**Break**
10:10-11:15	**Discussion of small group rankings & refinements: Assessing consensus**
11:15-11:40 am	**USFS next steps**
11:40-12:20 pm	**Wrap-Up**
12:20-12:30 pm	**Final Group Comments**

Kaibab Forest Health Focus, Meeting 4, June 2-3, 2009
Meeting Minutes

Stacie Hamburg, Pascal Berlioz, Steve Gatewood, Holly Kleindinst, Andi Rodgers, Shala Hedwall, Tayler McKinnon, Bill Austin, Ethan Aumack, LeAnn Scrimsky, Mark Herron, Ed Smith at the table.

Eric: Welcome back to the final meeting of the KFHF. We have an ambitious agenda, and want to refine of areas and treatment agreement and disagreement, and want to make sure the maps represent what we've decided. We will do some small group work to get modifications/edits and make sure that everyone's comments have been incorporated in the narrative. Finally want to develop a group understanding of how the FS will use the information that we've developed.

I want to start of with a review of the 4 levels of support:
1 &2 can live with, even if not exactly what you want
3 need minor changes needed
4 need significant changes needed

If there is constructive criticism that can make these easier to implement, we want to capture that information. Please articulate concerns now so that we can get these incorporated or discuss these.

Mike – I want to say thanks to each of you who have spent so much time and effort working on this project and we are looking forward to the product that comes out of this. I have noted the 4-Forest effort is moving in and out of focus with the KFHF. We realize that some of the first projects will occur on the KNF, but will also occur on adjacent forests. I want to keep some separation between the two projects, and I think over the years these will inform each other. We want to focus today on the KFHF. The North Kaibab District folks are not joining us at the meeting with the exception of John Riling. I have asked them to focus on the Jacob-Ryan project up in Fredonia. Lets focus on the completion of this process today, and it is important that you weigh in if you have concerns. I hope you will do this in a constructive way. I will be here today and tomorrow.

Map Revisions
Eric: We will shift into the revisions to the maps that have resulted from our meetings. We'd like to explain what has been done, and if there are changes as a result of this meeting, we'll make those adjustments. Please feel free to ask Jill about the background that produced this analysis.

Tom: I want to clarify that this is the fourth regular meeting, plus the small group meetings. We are hoping this will be about refinement and polishing versus rethinking the basic elements. We are striving for as much concordance of views as we can. Jill has been working hard to make these adjustments. I don't want to prevent insights to occur, that might require more detailed analysis, but we do want to finalize the input as much as possible today.
Jill – We'll start with Tusayan. We talked about basing Tusayan on active crown fire potential and the values in Coconino Rim area. We divided the active crown area into two segments along FR 302 versus the watershed boundaries (although it was very close to the road location). The Coconino Rim is based on the Inventoried Roadless Area (IRA) boundary. The urban area around Tusayan was dropped based on the fact that many treatments have occurred in the community protection zone.

Eric: Questions or concerns about the 3 areas on Tusayan?

Mark: I thought we'd backed away from the rim.

Jill: We based the boundary for the location on the IRA boundary. When you see the treatments, you'll see that they are limited to the ponderosa pine.

Tom: We started out wanting to identify areas that need treatment. The group has leaned toward identifying priority areas.

Jill: I am having some technical difficulties. I am displaying the treatments for the 3 areas. You'll notice on the Coconino Rim much of it has steep slopes and sensitive soils, and treatments are limited to reducing from active to passive surface fire. The pine section would receive mechanical treatment and fire.

Tom: The Coconino Rim is largely under fire-only treatments.

Pascal: Right now there is no priority among the areas?

Eric: We will be refining the priorities/treatments in small groups.

Taylor: Just to clarify, what does the pink indicate versus the orange?

Jill: The pink indicates treatments and fire.

Taylor: The brown is fire only because of the IRA?

Tom: We are using the fire models for an estimate of how we believe fire would behave under extreme conditions. We are making relative decisions about treatment areas and treatments. These are not exact interpretations, we are using them to help us compare area A to area B. We can calculate later what kinds of actions would be needed to move from active to passive fire conditions.

Taylor: What percentile were these run under?

Jill: 97 percentile. The two areas shown in lighter pink to the west are simply reference points on the map.

Williams
Jill: What we talked about here were the bands around the mountains (mountains), the community protection zones (CPZ) and Sycamore Rim area. What has changed is that roads were used for dividing the areas versus watershed HUC's.

Taylor: What was the rationale?

Jill: It was for management, it is easier to find these based on roads. The area to the east of Kendrick Mtn is on the Coconino NF, so is out of our influence to some extent.

Taylor: These are all priority areas?

Tom: I'm not sure that we got much guidance about breaking these up. We tried to break these into similarly sized areas based on roads. Some of the pine-oak development helped to influence the divisions too.

Pascal: We should interpret that the divisions are not based on current treatments or NEPA?

Jill: The gray represents current or completed NEPA.

Tom: The gray areas do bring into question when the KFHF work would become relevant on the Williams RD.

Pascal: Would the areas that are currently started with NEPA be treated first?

Stu: Perhaps, because the NEPA would be completed or soon completed. The rest would require NEPA analysis before they could be implemented. I think less than half has been contracted.

Chris: If I am remembering right, a lot of Kendrick Mtn burned a few years ago, and included some of the flat below it. How does that factor in?

Holly: One thing we do know is that even though we have treated some in these areas, these still came out at high risk.

Jill: There was a lot of drawing on the map around areas of interest. The only place I know the high fire risk came into play was in the Sycamore Canyon area.

Ethan: Based on this process, we have worked in smaller areas because we expected to prioritize these. The areas that are not color coded have not had any explicit instructions.

Tom: I think the color coded areas represent the highest priority and areas that would be dealt with in large scale treatments. The placement of the colored areas would afford some protection to the areas we haven't prioritized.

Ethan: This doesn't represent a broader landscape-scale representation of the district. I would hope that the entire district would undergo a similar type of process.

Tom: We are just identifying the first priorities so that the next projects we develop are based on areas where there is strong public support. There is a lot of the landscape that we are not indicating treatment for, and the refinements for the small groups could give some recommendations about these areas.

Ariel: As we work on the forest plan revision, these areas would be the ones that we would focus on in terms of specific objectives for the next 5 years.

Ethan: Are we going to try to lay out some timing expectations? Especially as these relate to landscape scale treatments? I think this would help to bring some clarify in the document.

Ariel: I think this will boil down to capacity. This is where we can frame the priorities. If we are able to increase our implementation levels, we could accomplish more. This is where I was saying that we could implement in 5-10 years. It should lay out a road map of where we go and how.

Tom: Can we put you on the spot a little to help us understand the timing that you are considering?

Mike: We'll be happy to give some estimates in our wrap up tomorrow.

Bill: I think that we have been discussing priorities and treatments, and we have discussed some priorities in terms of the color coding. I know we talked about that in terms of timing.

Eric: We expect the small groups to do some ranking as to high medium and low priority, and we want to give the large group an opportunity to do this.

Bill: I am seeing some darker orange areas on Bill Williams Mountain. I thought that some of the group was discussing treatment around the mountain, not on the mountain. We may not have agreement on this.

Jill: The lower polygon is within the community protection zone. It is based on the watershed boundary. Lets capture concerns in the small group break outs. Jill gave acres of each polygon.

Treatments: There is a lot of variation on this map. You can see the patterns of mountain bands in purple, CPZ in blue, and gold in the Sycamore Rim area. There was a lot of MSO discussion for Williams, and Bill A and Mikele P worked on clarifying the information. We were able to get a little more refined based on this. I identified a ¼ mile swath southwest outside of the PAC boundaries. I wasn't sure what to do in the crucial habitat areas?
Bill: We didn't have a lot of time for complete communication. In the subgroup meeting we discussed buffers and treating outside of buffers. One of the things I was hoping was this could be a loose dynamic versus a rule. If there is an opportunity to strategically place treatment outside of the buffers, but if we are talking about inside these, there is more specific guidance.

Shala: I think we shouldn't talk about no treatment. If it is pure pine, these should be treated, in the pine-oak, follow the recovery plan.

Bill: This is based on cover types.

Andi: Is it better to deal with in the narrative versus maps?

Bill: I would resolve this with some discussion of buffers and cover type and treatments.

Shala: I would try to explain this versus showing on the map.

Eric: Please put those proposals on the small group break out comments.

Jill: Mustard in Sycamore Rim represents the MSO restricted habitat following MSO management guidelines. Orange is target threshold areas following management guidelines. Treatment is left general.

Shala: It looks like there are areas that have no treatment in them.

Jill: The areas that are not colored are not ponderosa pine.

Ethan: Part of the discussion I remember was because of the NEPA ready areas uncertainty. Are we representing a partial approach versus a more complete approach? It seems like we haven't spent the time on this because there are large areas that we can't predict the treatments.

Tom: In the small groups, we can identify the treatment guidance for the areas that have not been defined. The Williams area has not had as much discussion or guidance as the North Kaibab has.

Andi: The Syc area seems to focus on MSO, is this practical?

Mark: We don't typically take that tact.

Tom: If you think that this could have application to landscape scale treatments, maybe this is an approach to broad brush guidance.

Bill: My perspective is that we were trying to focus guidance on MSO areas, these are recommendations for these types.

Ariel: The areas that are not colored are not pine?

Jill: It is a patchwork. I could have taken anything that was not MSO in pine and apply the optimization treatment on these.

Tom: Lets refine this in the small groups.

Bill: The summaries tried to cover all of the different treatments that could occur in MSO. How is the remaining critical habitat dealt with?

Grey is NEPA, black falls out, gold is restricted, red target, white is urban area, purple is passive to active, blue is CPZ.

Bill: Does the blue show any MSO habitat? It would occur within the community protection zone and has to comply with the guidelines.

Shala: I think that is a project decision about how to deal with MSO within the CPZ.

Tom: We can represent where the MSO habitat is within the CPZ. The default treatment in the CPZ is fairly aggressive treatment.

Taylor: This is the first time I've seen discussion of cumulative impacts.

Ethan: I think we talked about active to passive fire activity. We did identify surface fire as a goal. My concern is that not modeling these out may not be representing the actual treatments that could be needed. We might agree on the basic treatment, but there may not be as much agreement on the actual treatments that would be required. How do we deal with this ambiguity?

Tom: We could phrase the guidance in a different way, we could use the heavy, moderate, light treatment scale. We could also choose not to use the FLAMAP model. The key is the intent, is the intent that we would see surface fire dominant and a crown fire as rare event. The small group effort can refine this. Help would be appreciated, but I don't think we expect to get super specific.

North Kaibab
Locations – The priority areas were derived at the last meeting. They are based on a combination of HUC's and roads. HUC's for active crown fire and roads to divide into subareas. There was some discussion about priorities:

North Canyon above the rim, gray areas are Jacob-Ryan and Warm Fire, the west side pine is subdivided into similar sized areas. Blue polygon represents the Park-Forest boundary. For the

last area, it represents a special case where two agencies are managing these areas, and represents opportunities to explore treatment of these areas. We didn't receive guidance that this should rise to a priority area.

Ethan: I do think the park-forest boundary area deserves a priority. I'd like to see the blue boundary area to hugs the boundary of the FS and Park all across the south part of the project area.

Taylor: Is the east boundary in the pine belt based on a road?

Tom: No, it is a result of a hand drawn boundary. The other line represents the ecotone area where there is pine-dry mixed conifer. We need refinement about this area.

Bill: I want to underscore the comment Ethan made about the Park-FS polygon. I remember that it was one of three priority areas that we identified.

Bruce: I don't think we resolved what to do with the boundary area. We are discussing apples and oranges. We could look at the boundary area as an opportunity.

Eric: Please hash this out when you discuss the NK.

Tom: Is there anyone who doesn't agree on the boundary area?

Ethan: I think this is a priority, but a different kind, in terms of planning and ways to coordinate management. It probably requires separate discussion.

Eric: Please capture the discussion and adjust the questions.

Ariel: The area including the park-forest boundary is also a high priority location for treatment. We would need to engage the Park in discussion of treatment in these areas. It seems like these would be projects where active engagement of the Park would occur.

Ethan: I would hope that we could look at continuous management versus discontinuity based on agency boundaries.

Treatments –
Tom: If the boundary area is identified as a priority we can add treatment guidance to the area.

Jill: North Canyon was divided into two areas, no treatment/no consensus below rim, above the rim there were opportunities for coordination with the park.

Bill: The point where there was no consensus was including below the rim as a priority area.

Andi: Maybe I'm wrong but I think the slopes would prevent treatment.

Tom: It is also within Wilderness. I think the discussion is to preclude any treatment or whether there is a possibility for treatment on steep slopes within wilderness.

Jill: Mixed conifer is not being considered for treatments. Yellow is goshawk PFA. Angela Gatto was concerned that a ¼ mile buffer added a third treatment type; she requested the buffer be removed. Red areas are the south-facing aspect roads (a few have been outlined by hand to show

the change). We also removed roads in the east part of the ponderosa pine belt. Brighter green are where a treatment optimization approach would be used.

Ethan: My sense of the approach was to look at the whole area and it left some areas unresolved as to treatment approach. I think we were trying to get to a landscape scale approach and I'm concerned that we would only be treating the green groups this way. We need to be careful to represent that the NK approach was more complex and detailed than the approach on Williams District. We took this as far as we could, but we need to be clearer about our approach to the NK. This map looks like we have much more detailed treatment guidance than we actually arrived at.

Tom: We were not able to average the treatments across the area because of topography. We could try to describe the strategy, it is relatively high resolution, and may not be simplified as well as it could be. We could make adjustments like dropping a class of guidance out or combining some. It the idea was to apply a treatment optimization across the landscape; then many of the classes would disappear. I thought that some of the discussion preempted or trumped the optimization approach. If it was the reverse, we could come up with a landscape that looks very different.

Ethan: My memory is that we were trying to take the optimization approach across the landscape, but it wasn't unrestricted.

Andi: Why was the treatment optimization applied just to the NK? I like it and it seems like it should be applied on Williams and the Tusayan.

Tom: I feel it is somewhat of a deferral, because all of the decision put off to whoever is running the model. I discourage the group from taking that approach, rather than taking on a broad brush approach that could include it as a tool.

Eric: Are there questions?

Taylor: I think the optimization discussion is a good one. Recognizing that we have a limited amount of time, I think it is interesting to explore it. I was glad to hear that there was a road buffer, but with the idea that we need to think of ways to manage or restore fire on the NK. The idea of roads acting as anchor points dividing the area into discrete treatment areas is important to include in the narrative.

Break Out into Small Groups

Don't write full paragraphs, but clarifications, rank the areas (red – highest, yellow – medium, green – low). Each group needs a recorder.

Eric: We will try to pull this info together, and tomorrow we will summarize these refinements. Tomorrow we will also look through the primary discussion issues and will try to refine these.

June 3, 2009
New Agenda for today:

8:35 Small Group Report Out
9:35 Draft report content
9:45 Issue narratives
10:15 Break
10:30 KNF steps

12:00 Wrap up

Eric: I am asking each group to present its ideas, then we'll get clarifications, and finally assess whether the larger group wants to incorporate the comments.

Tusayan Priorities
Green: Highest priority was the north west pine, then south west pine, and finally Coconino Rim.
Orange: Did not have consensus on priority, there was some agreement on having the south west pine as the highest priority. There has been some work done by the Park between the boundary and the rim of Grand Canyon. Coconino Rim has unique features, but treatment to the south west would help protect the Coconino Rim.
Red: All areas should three be planned together, 44,000 acres. It is okay to sequence treatments within the single planning unit. Can incorporate special resource needs on the Coconino Rim area.

Andi: The dots indicate a preference for tanking, but since it is a small area, it makes some sense to make it one large area.

Tom: We broke things up into 10-12,000 acre blocks, but is there discussion about this?

Steve: The strategic placement within a larger unit is critical to the planning, and this is an opportunity to look at a large area.

Ariel: My sense is that for this area, we could scale up because there is less complexity.

Shala: I think we need to figure out how to better do the planning on a larger scale.

Ariel: I think we are a little shy because of some bad experiences in the past.

Tom: I think this is moving forward in the right way. Part of the scaling issues gets sidetracked when we ask what is the right scale? What is probably more important is to be able to scale up and down as needed. We need to get more facile at moving up and down in scale, but seamlessly link between the scales.
Eric: Are there any 3's or 4's? No, we have unanimity on the Tusayan priority locations.

Tusayan Treatments
Green: Coconino Rim is a good place to use fire use to the maximum extent, partly because of the types of resource present. For example, heritage sites in this area are less susceptible to low intensity fire. We also have a lot of opportunities to use fire for resource benefit, and Tusayan has had lots of previous treatments. This district is less departed from reference conditions. We do want to make sure we are managing for the clumpy-groupy structure that is more sustainable. We expanded the desired treatment to be surface fire with occasional group torching, and not passive ground fire. Calibrate fire with field experience and not just depend on model.
Orange: Need to disclose changes in key variables so that it is public knowledge. Want to assure heterogeneity across the landscape.
Red: Because of nature of slopes and arrangement on Coconino Rim, we suggest having a fire use plan prepared for that area. We also suggest adding the clumpy-groupy comment and fire modeling comment to all districts.

Eric: There is a suggestion that we add the clumpy-groupy comment and fire modeling comment please make sure you are considering this in your assessment. Any 3's or 4's? We have unanimity on Tusayan District.

Williams District Priorities
Orange: CPZ highest priority, there was a recommendation to remove the mountain piece on Bill Williams Mountain, have the mountains second, then Sycamore Rim. There is a huge opportunity in the Sycamore Rim area, for some large scale treatments.
Red: Want to include the mountain piece on Bill Williams because it came out as high priority even if we aren't going to treat it. Sitgreaves is higher priority than Kendrick for the Mountain bands.
Green: We felt the Sycamore Rim was lower priority because of the existing heterogeneity. There are vegetation type changes and openings and the district hasn't found that there is high intensity fire behavior. Include the other Sycamore Rim polygons. The lower band on Bill Williams is slightly lower priority because of the recent fire treatments, but there are structural treatments needed.

Ethan: Seems like we are missing the other high priority/need areas. We do need to be able to talk about all areas without getting hung up on the language. For example if all of Bill Williams is a priority, are we looking at treatments that would deal with these?

Andi: We need to remember to distinguish between analysis area and treatment areas so that we are distinguishing between the priorities.

Tom: I prefer to minimize jargon. The analysis area is the boundary that surrounds the district units and the area that we have data. Within that are areas that have been identified as priorities. Within the priority areas there are also areas that have been identified for treatment. The priorities have been identified because of the resource values. In this group we have focused on areas for treatment. I'm suggesting that we formally acknowledge these two distinctions. You will have an opportunity to edit the draft text regarding this.

Bill: What we have been focusing on is priorities that implied treatment. We were trying to get the most concurrence with that. Now there is a suggestion that we talk about priority areas for their values, and areas for treatment.

Ariel: We had this discussion about priority areas not necessarily representing treatment. We have talked about the values first, then choosing areas for treatment. It can't be separated artificially, we need to be clear what the two discussions are so that it provides the context.

Tom: Priority has been used in two ways, please send ideas about how to clarify the terms.

Pascal: I suggest high value instead of priority.

Tom: I think this is a word smithing issue, versus disagreement.

Bill: If high value means value of resources and some of these are identified by treatment priority, we may be okay. If we are talking about treatment priority only, there will still be disagreement on these.

Eric: We'll discuss the whole mountain as having high values, but not all areas are priority for treatment. Are there comments about Sitgreaves over Kendrick? Sycamore Rim priority? Are

there any 3's or 4's? No, but pending some word smithing to clarify high value versus priority for treatment.

Orange: We spent most of the time trying to figure out how to represent treatment optimization in the non-MSO areas for Sycamore Rim, and that there was a need for additional modeling. Didn't want just the MSO treatments shown; we want to show the entire area with the MSO indicated. The CPZ areas should include MSO locations. First cut would be to map the MSO and guidelines be followed if possible, and if not, we'll deal with it later on. We haven't had time to discuss appropriate treatments for the Sycamore Rim area. The MSO areas are being shown as special treatment. We were trying to focus on the treatments around these. We were very interested in strategic modeling for these areas and what potential variables could be used.

Mark: I am concerned about the term strategic modeling and what this means? I think we try to look at all the values, if modeling can take in all the factors that is great, but if it is focused on fire, I have reservations.
Red: We were echoing what the orange group was saying. We clarified MSO terminology. We also felt that we didn't want to avoid treatment in MSO habitat, we want to look at the whole area and be strategic about placement of treatments to benefit all values.

Eric: Clarifications?

Tom: I'm trying to summarize what I've heard. I think I heard that the Sycamore Rim area emerged because of fire risk there. What I am hearing is that strategic treatments could be used for a first cut, but then layering other concerns on it to adjust treatments. The goal is to effect fire behavior, and that modifications would be used to consider special concerns such as MSO.

Sara: This area was also identified because of high bio-diversity.

Shala: We were also thinking about future fire planning in terms of being able to prep the area to be able to withstand natural ignitions.

Mark: I don't think this is much different than reducing from active to passive crown fire. It is similar to Tusayan, with MSO tempering the treatments. I don't think we want a lot of crown fire in this area.

Steve: I think we are considering some areas of active crown fire, but to have treatments that would cause the fire to move to the surface. We are suggesting combining the polygons for fire planning/preparation.

Tom: The Sycamore Rim area is larger than the 44,000 acre area in Tusayan. There are some areas where combining areas is appropriate, there may be some places in the CPZ that aren't as appropriate.

Ethan: I have composed a statement to include in the report that tries to capture the concept. *Need to include Ethan's statement.*

Eric: We'll include Ethan's statement in the report for editing.

Andi: I think the acknowledgement of risk to bio-diversity needs to be included.

Ariel: I am concerned about the size of the area for NEPA planning, and it looks like there might be a logical split into two areas.

Eric: I'd like to assess the level of support?

Taylor: I think the treatment refinements are all over the map, and may be conflicting. I think it will be helpful to revisit this in print when it is spelled out.

Eric: Are you limiting this comment to Sycamore Rim?

Jill: For clarification, almost all the comments were directed to Sycamore Rim.

Taylor: What is sustainable, uneven aged management?

Mark: The forest plan is specific about the multiple age classes distributed across the landscape. I am concerned about the concept of just thinning from below because it violates the forest plan direction.

Bruce: All quantitative studies in ponderosa pine support the multiple age class distribution.

Steve: Can we take that language out and move to the clumpy groupy, multiple age classes?

Mark: The only change is the sustainability over time.

Taylor: I am concerned about the sustainability being counter to the forest plan. I think we all are familiar with historic ponderosa pine. Some of the ways it is manifested are not something that our organization can agree to.

Tom: I think that there are a series of issues that we will deal with later today. There is another mechanism for including this other than the treatment maps.

Eric: I need to assess support. Do we have general consensus or should we wait until all can read the report? Postponing the consensus about the refinements until they are written?

Taylor: There is silivicultural guidance coming out of the Region that many organizations don't agree with.

Tom: I hope we can avoid putting too fine a point on the disagreements. We can articulate the disagreements about the areas where we don't have agreement versus those we have agreement on.

Ariel: one of the original objectives is to articulate areas of agreement versus disagreement.

Eric: There seems to be greater clarity around the original information presented by location?

Bruce: I don't think anyone is trying to suggest a regulated versus unregulated uneven aged forest. Is there disagreement about uneven aged?

Tom: We are not rewriting the forest plan or trying to implement it. We are trying to provide some guidance about the treatments. We are getting into confusing about these two things. We are not trying to refine the language in the forest plan.

Pascal: I think your point is well taken, one way to proceed is to remove certain points. Another way is to characterize the discussion about uneven aged management versus district.

Ethan: Some of the confusion starts when we talk about specific prescriptions. My sense is that we like to agree on areas, and strategic and perhaps somewhat tactical guidance. I think we need to avoid the site specific language. We should get as far down the road as we can about broad approaches, acknowledging there are critical questions at the prescription level to be resolved.

Pascal: One other way to articulate this is that uneven-aged management with concerns regarding implementation.

Tom: If we remove the uneven aged management, are the rest of the approaches receiving broad support?

Eric: Can we remove the uneven aged management issues from the refinements? Yes.

Break

North Kaibab
Eric: I'm going to ask Tom to walk through the refinements noted by the groups.

Tom: There are several big issues that came up, some that we've discussed, and a couple of unique issues. There will be some that will require additional focused attention to resolve these. How to treat in mixed conifer is one.

Red: Add park boundary area back in, along the entire southern boundary (there are overlaps with the pine belt and north canyon). It appears no one disagreed. Add North Canyon lower area as a high value area, versus priority for treatment. On the west pine belt transition zone, it was suggested that the entire area be identified as high value, but there is no consensus about mixed conifer treatments. One person said that mixed conifer be excluded from any treatment. Consider west side as one planning unit, but recognize the need for sequencing, and this be from south to north.

Bill: North Canyon below rim is high value, but not a priority area for treatment. The Boundary area appears to have agreement. North Canyon above the rim priority for treatment and below the rim high value. Western pine belt with pine only treatment as priority.

Eric: Clarifications? Are there any 3's or 4's with the refinements? Per Bills comment there is unanimity.

Tom: I am suggesting that the mixed conifer not be included in priorities. Note that the ranking on the areas is all over the place, and it isn't helpful in ranking which area. These are all priorities, and it is unclear what is the highest ranking one.

John Riling: could we get some clarifications about the locations?

Ariel: I asked Pete Fule about his rationale, his #1 priority is the park-forest boundary. His concern is that the Park gets some fire use fires, and they have to suppress them as they approach the forest boundary. He thinks if this area could be treated, this might not be a barrier. North Canyon for some of us there was recognition of the high value and need to protect the area.

Taylor: My thought is that the issue along the boundary is more managerial than related to implementation.

Bill Noble: North Canyon has a number of unique species/subspecies that occur only there. If a fire went through they would be gone.

Tom: I think many people recognize the importance of North Canyon.

Ethan: I found it difficult to prioritize between the pine belt and North Canyon. The west side deals with the opportunity to work at larger scales and the ability to change the possibility of large fires. Both are very important. The boundary area is less of a priority.

Treatments
Tom: I'm going to take these in a different order than shown. Carry forward planning that enhances the opportunity to move toward landscape scale fire. The extent to which agreement is identified for mixed conifer will determine the extent of treatment of mixed conifer. This appears to be an issue that is ripe for consideration soon. Mixed conifer – if pine belt must include mixed conifer, then the MSO guidelines should be mapped and implemented there. Fire use is prohibited now, but interest in experimental treatments (but not in MSO). Light treatment to increase fire in mixed conifer MC is appropriate but may require a plan amendment. Consider experimental treatments so that we can demonstrate different results. How should we deal with this? It seems there are 2 themes. It is controversial because we lack knowledge of effects. Another group feels it is critical and needs to be dealt with because of the potential for undesirable fire is very high and would effect older pine, creek, and wildlife. This group has the responsibility to articulate a way forward.

Ariel: The text should reflect the complexity and range of refinements included.

Bill: I think there is compatibility. We recognize the priority treatment units include MC, and that MC will be treated. If we apply the guidelines to those areas, there is a basis for doing those treatments. I think it should be restricted to ponderosa pine in the pine belt at this point.

Tom: Can you agree that North Canyon is a priority for treatment?

Bill: Yes. The opportunity for mixed conifer treatments under the MSO guidelines is there.

Ethan: I would hope we could take this on with the goal of learning together. Perhaps working at smaller scales on this issue would help to build agreement and understanding. I don't know how exactly, if it is thru monitoring, or what.

Tom: I am hearing that the green group point about experimentation is what we want to do. In the upper portion of North Canyon is the place to begin this. It may help provide guidance for other areas.

Steve: I'd add to that we need to prioritize North Canyon as the highest ranked area so that we can get the mixed conifer issue moving forward.

Taylor: Experimental raises some red flags in terms of the MSO guidelines, and how those would be interpreted.

Ariel: I think experimental means setting up repeatable, measurable design.

Andi: The flip side of doing it at North Canyon is that it is above the creek and a high value area. Should we consider mixed conifer experimental treatments elsewhere?

Tom: 2 possibilities: do experiments in another place, or do treatments in the critical location itself. If there is a sense of which is preferable it would be great.

Shala: I think treatment around the upper North Canyon area and the boundary provide some protection.

Bruce: An observation is we don't want to get sidetracked with too many #1 priorities, but it might be possible to do some actions that provide limited protection while other work is being done.

Eric: Assessment of level of support for the conceptual approach to mixed conifer?

Bill: In the western pine belt, the treatments are in ponderosa pine.

Chris: In the upper portion of North Canyon, it is at the highest point of the plateau and there have probably been stand replacing fires in the past. To what extent is there resilience because of this?

Tom: Remove buffers from PFA's, that this is a tool at the treatment level, but not appropriate for the landscape level.

Pascal: What was the rationale for buffering to start?

Ethan: I think it was a differentiation of the intensity of treatment.

Bill: Could we capture the topic in the narrative?

Eric: Is there support for removing the buffers from the spatial analysis? Yes

Tom: Around the springs in North Canyon, there is management direction to suppress fire. Is there a need to include low intensity fire if one occurred.

Ariel: With the suppression mandate, no fire can be managed. She thought on some days a low intensity fire might be possible.

Bruce: the forest plan limits fire to less than 5 acres.

Tom: This doesn't have huge import, but it does suggest treatment in the lower area.

Bill: This is a policy question for the KNF for fire in this location. This seems out of the context of what we are considering.

Ariel: I think it is out of the context for consideration.

Eric: Is there agreement to remove this comment? Yes.

Tom: Prior agreements regarding ponderosa pine treatments represent the best way to move forward.

Ethan: As an aspiration in this document, we need to state this is another way to find agreement about this set of questions. We should always try to build on other agreements, but it wasn't a specific agreement here. I just don't think its useful to bring that up here.

Tom: Any additional comments?

Eric: Tom has tried to draft some responses about the issues identified earlier in the process. We want to have self-selected groups provide some additional refinements added.

Tom: I looked thru the initial list and the ones that have continued to surface. The first group is other issues (if you think there are issues not included, please provide input), wildlife considerations, economics and role of industry, old trees/diameter caps, monitoring and adaptive management, desired conditions. If you want to draft a few sentences on other topics, you can do so.

Economics (Pascal)
There is a need to integrate economic sustainability along with ecological sustainability. Not everything that is suggested will result in an economic value. Contract mechanisms need to recognize the need to offset economic constraints with places that are profitable to treat.

Wildlife Considerations (Andi)
Complexity of spatial arrangements is conveyed. Treatments to benefit wildlife is oversimplified. Management at multiple scales and heterogeneity at larger scales is recognized, but we manage at smaller scales. MIS is going away and need to insert different terms.

Old trees/diameter cap (Ethan)
Everyone appreciated the commentary, but too little time. Agreed to simplify down to Ethan's language. Split out old growth versus large trees. Need for collaborative approach. May be addressed at larger scales and/or project levels.

Shala: I think the language suggested is good.

Ethan: We brought to edge where there is agreement, but not as much value in trying to find agreement on details.

Monitoring (Jared)
One of lead-ins is that next key need is monitoring and design of a monitoring plan. We want to add economic, replicable and multi-party monitoring. It might help cut the cost of monitoring thru use of volunteers. Monitoring should be done to check our progress, since the forest plan is updated at least every five years, and need replicable models that can be rerun.

DC – (Steve G.)informs and directs mgt actions. Expressed at lsc scale and desire of group to proceed at the landscape scale while recognizing impacts on wildlife and cultural resources. Shorten discussion in between.

Eric: We are getting close to wrapping the report topics and content up.

Mike, Bruce, Ariel, Martie
Reflect on the perspectives on the process.
Bruce/Ariel – we wanted to identify some objectives for the forest plan that were collaboratively developed. We will translate some of the dialog into objectives and dc's. Gave example. Although it is not a plan component, a monitoring plan is required. It will help us determine how far and how well we are meeting dc. Multiparty monitoring will be part of the monitoring plan. We will put out draft objectives. Bruce distinguished between dc and desired post treatment conditions.

We will need to discuss a regulated forest. Landscape scale dc will come out in draft plan, as well as mid-scale and small scale (stand).

Martie: We have forest plan guidance and we take it to the site specific level. There were times when my stomach was knotted up, and as we've worked thru the process, this has helped to affirm the priorities we've discussed at the district. I will be anxious to see what the report recommends and we will determine where to go next with it in mind. NEPA capacity was brought up. I will use the example of McCracken, it has been worked on for 2 years, and are still not finished. I am a strong advocate of using old projects and renew NEPA to get them implemented, but will also review the info that the report comes out with.

Mike: I think for Tusayan, you have nailed where we need to go and the work at a landscape level. We have a new DR, Angela Parker from Plumas, Lassen and Tahoe. She has heard some about this process and will hear more. We use a shared zone for Williams and Tusayan. As we look at how and when we start projects, we look across both districts. We will finish up projects that we have started, but will look at the high value areas and will move them into the rotation in the next couple of years. For the NKRD, I am not certain where we will begin. We will use the prioritization to decide where to move with the next project. It won't be a 30,000 acre MC project. Your work illustrates a complex situation. I think you will see your work reflected very soon within the in the next few months as incorporated in the draft forest plan.

Has this met your expectations?
Andi: Capacity, do you think this will help work at larger scales? Yes we have started the 4-Froest Initiative and it will focus on the larger landscapes. It will provide the projects for the next 10 years. Other projects will continue to go on, but probably at smaller scales, we just don't have the capacity to do that. The intersection will come in the future where we learn in both projects, and I anticipate the program will become blended and accelerated.

Tom: There was a specific request about timelines? Won't see if next year, but will see in outyear planning for NKRD. Can you give us some more specifics?
We have a normal budget allocation, and I don't expect it will increase. We are going to have to look at partnerships to leverage dollars. What we can take on is dependent upon the allocation. McCracken would provide work for 3-5 years. On the SZ we will look at 3-4 years out for project planning. Left-side planning will start next year for one of the CPZ of West Parks area. NKRD will have 3-5 years of projects. There are some small projects around in the community protection vein. We do need to get into the MC issues soon.
Ariel: the forest plan input will happen now. There will be inventory and monitoring that could be accomplished sooner.

Given the strong interest, we will share where we are on these projects. I appreciate the strong interest, and appreciate what particularly Bruce and Tom have been able to accomplish. I look forward to seeing the draft report. It is a starting point and a work in progress because we will need your continuing participation.

Eric: We will be sending an online evaluation in the next few weeks, to help us improve our process at ForestERA.

Tom: We will be sending a draft report out soon. I want to give you an idea of what it will look like. I expect that a first draft will come out for comment within 2 weeks, then a draft report will come out which can be further refined, then we will finalize. We will need to meet contractual obligations, but also want to capture the sense of agreement by the group. We want to move it forward in a clear way with minimal reviews. We would appreciate your attention to the specific

things that you have been engaged in. Went thru draft format and expects that the report will be a 30 page document, with appendicies. It will be very targeted at the scales and objectives that we agreed to with this analysis. Your work isn't entirely done, but is largely. We really appreciate your work on this project. Questions or closing suggestions.

Steve: Can it be sent out electronically?

Tom: We'll be careful of the size, and will post to our internet site. We can make limited printed copies.

Additional input: When do you want this?

We want the input prior to the first draft, but will need some additional input on cultural resources and other topics.

Mikele: Would it be appropriate to post the refinements that came out today.

Tom: This was very provisional language and I'd prefer them via email.

Eric: Want to do a round robin as we leave the room.

Taylor: Useful process especially with ForestERA facilitating the process and managing the process well. I don't think this was geared toward plan revision, but am concerned about this being incorporated.

Ariel: I think the process met our expectations in terms of the report and data set. We look at this as a place to begin working from in plan revision, not final.

Stacie: Interesting process, there are a lot of holes left and there are 3-5 years before it gets rolled out. I hope we can build upon what has been agreed upon with the group at the table.

Mark: I think we met the objectives. I think there is disagreement out there and agreements, it was a good process.

Andi: I really appreciate that we have been at the table, I know I had a part in determining where that will be.

Shala: Thanks. We keep doing these things and I think we are moving forward. I would hope that we can get closer to hitting the ground.

Steve: Thanks, we are moving forward. I think 3-5 years is a long time.

Bill: Thanks for the opportunity.

Sara: Special thanks to Jill for interpreting the random thoughts that we gave you.

Bruce: I think this gets collaborative process going for forest planning and it provides a good starting point.

Val: Very informative

Amber: Interesting, glad to learn how groups interact.

Charlotte: this is the kind of process that we must use, and it needs to be applied to all levels of projects. It seems like the way to make progress versus doing the same old thing.

Jared: I am glad to be involved. It has been really helpful as a GIS person, to clean up the layers and get it out there.

Martie: Good process. It is a starting point and not an ending point.

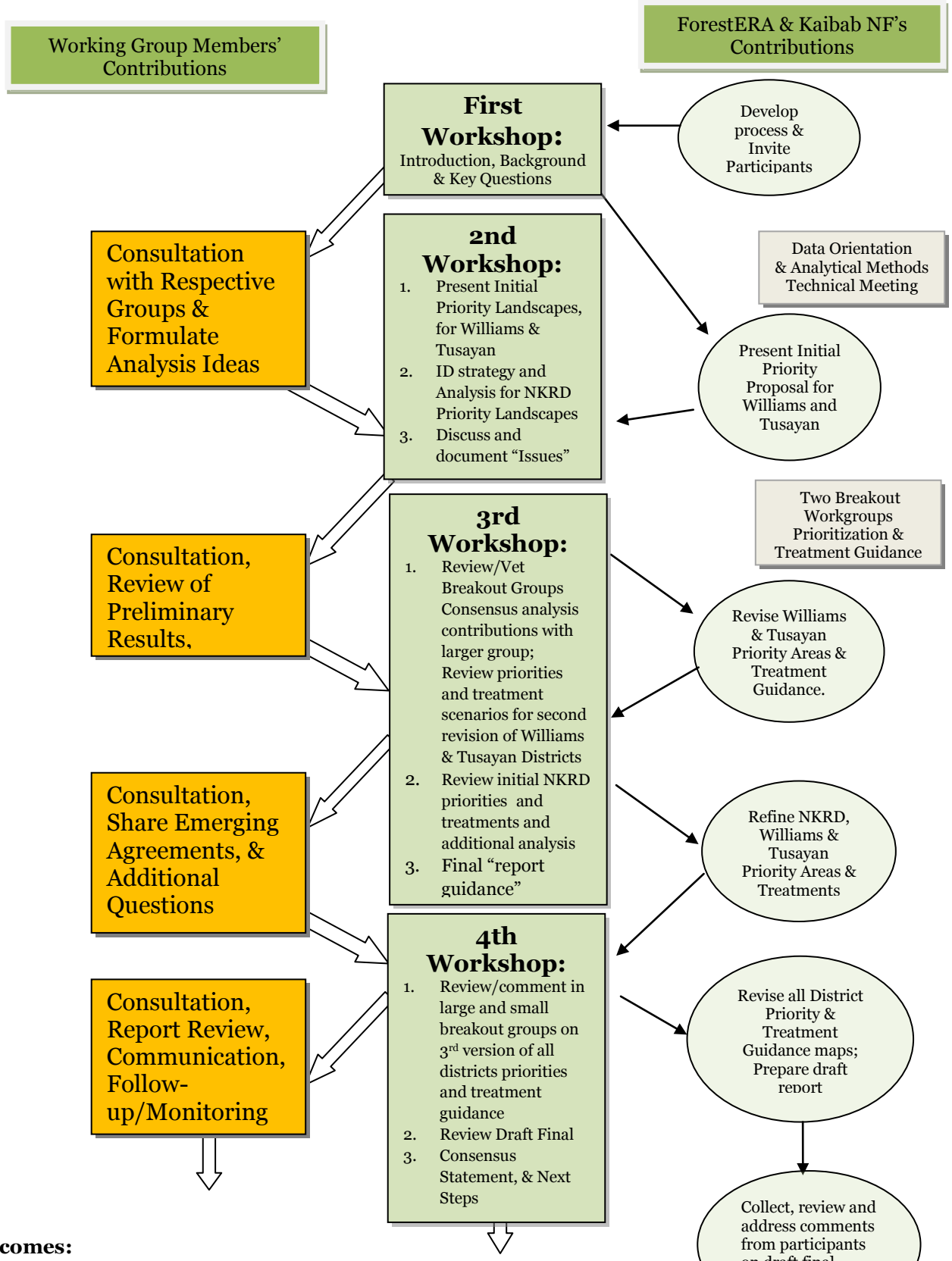
John: Good starting point and hope we can keep it going.

Mikele: It is a good process and why it isn't a standard operating procedure, I hope it will become that. I envision it happening for project development.

Mike: I want to thank all employees and ForestERA staff. I feel fortunate that we have the resources and quality service with you. I look forward to further work with you.

Eric: It has been a great introduction for me. Thank you all, we look forward to continued interactions.

APPENDIX V. *Kaibab Forest Health Focus collaborative process diagram*



Outcomes:

- Identify priority areas on each KNF District & ecologically based treatment guidance
- Produce consensus report and maps to inform work of KNF managers
- Build strong public engagement and outcomes with high degree of support

APPENDIX VI. *Kaibab Forest Health Focus – Meeting IV relative priority ranking table*

Relative rankings of priority areas (Meeting IV – small group discussions)					
	Red	***Yellow***	***Green***	***Total***	***Rank***
N. Kaibab					
Western pine belt	15	10	2	27	1
North Canyon	9	10	4	23	3
Park Boundary	16	4	6	26	2
Tusayan					
Coconino Rim	-	-	12	12	3
East Tusayan	6	20	-	26	2
West Tusyan	30	4	-	34	1
Williams					
Sycamore Rim		14	6	20	3
Community Protection Zones	33	4		37	1
Mountain Sides	6	8	7	21	2

APPENDIX VII. *U.S. Fish and Wildlife: Interpretation of Mexican spotted owl guidelines as they apply to forest restoration treatments on the Kaibab National Forest*

Summary of Mexican Spotted Owl Recovery Plan Management Guidelines

The Williams Ranger District of the Kaibab National Forest (Forest) is within the Mexican spotted owl (MSO) Upper Gila Mountains Recovery Unit, and the Tusayan and North Kaibab districts are in the Colorado Plateau Recovery Unit. The mixed conifer and riparian cover types, as defined in the Mexican Spotted Owl Recovery Plan, are MSO habitat in all three districts. In addition, the pine-oak cover type, as defined in the recovery plan, is MSO habitat on the Williams Ranger District of the Forest. The MSO recovery plan further describes categories of MSO habitat that merit differing levels of protection and management as outlined below.

Protected Habitat

Protected habitat includes MSO protected activity centers (PACs) and steep slopes.

<u>Protected Activity Centers (PACs)</u>

1. These guidelines supersede steep slope guidelines; that is, steep slopes occurring within PACs should be managed under PAC guidelines.

2. No harvest of trees >22.4 cm (9 in) dbh is allowed in PACs.

3. When fuelwood harvest in PACs is unavoidable, various forms of management can regulate access to PACs and to the types of fuels harvested. Potential forms of fuelwood management include road closures, prohibiting harvest of important tree species such as oaks, prohibiting harvest of key habitat components such as snags and large downed logs (>30 cm [12 inch] midpoint diameter), and encouraging the harvest of small diameter conifers less than 9 inches dbh.

4. Prohibiting fuelwood harvest of key habitat components such as oaks, snags, and large logs should be applied both inside and outside of PACs to ensure that these special components remain on the landscape.

5. Road or trail building in PACs should generally be avoided but may be allowed on a case-specific basis if pressing management reasons can be demonstrated.

6. Implement a program consisting of appropriate treatments to abate fire risk. The program should be structured as follows:

    a) Select up to 10% of the PACs within each Recovery Unit that exhibit high fire risk conditions. Nest sites must be known within these PACs. Ideally, a paired sample of PACs should be selected to serve as control areas.

    b) Within each selected PAC, designate 40 ha (100 acres) centered around the nest site. This nest area should include habitat that resembles the structural and floristic characteristics of the nest site. These 40 ha (100 acres) will be deferred from the treatments described below.

c) Within the remaining 203 ha (500 acres), combinations of thinning trees <22.4 cm (9 inches) dbh, treatment of fuels, and prescribed fire can be used to reduce fire hazard and to improve habitat conditions for owl prey. Habitat components that should be retained or enhanced include large logs (>30 cm [12 inches] midpoint diameter), grasses and forbs, and shrubs. Emphasis of the spatial configuration of treatments should be to mimic natural mosaic patterns.

d) Treatments can occur only during the nonbreeding season (1 September-28 February).

e) Following treatments to 10% of the PACs, effects on the owl, prey species, and their habitats should be assessed. If such effects are nonnegative, an additional sample of PACs may be treated. If negative effects are detected, these effects must be carefully evaluated. If they can be ameliorated by modifying treatments, those modifications should occur prior to treatment of additional PACs. If not, no additional treatments should be permitted.

7. Within the remaining PACs, light burning of ground fuels may be allowed within the 500 acres surrounding the 100-acre PAC centers, following careful review by biologists and fuels management specialists on a case-specific basis. Burns should be done only during the nonbreeding season (1 September-28 February).

8. Within PACs treated to reduce fire risk, either by the use of prescribed fire alone or in conjunction with mechanical removal of stems and ground fuels, pre- and post-treatment assessments (i.e., monitoring) of habitat conditions and owl occupancy must be done.

9. Specific habitat characteristics that should be monitored include fuel levels, canopy cover, snag basal area, volume of large logs (>30 cm [12 inch] midpoint diameter), and live tree basal area.

10. If a stand-replacing fire occurs within a PAC, timber salvage plans must be evaluated on a case-specific basis. In all cases, the PAC and a buffer extending 400 m from the PAC boundary must be surveyed for owls following the fire. Salvage logging within PACs should be the exception rather than the rule. In particular: (1) no management activities should be undertaken that do not protect soil integrity; (2) actions should not be done that impede natural recovery of disturbed systems; and (3) salvage activities should maintain and enhance native species and natural recovery processes. Further, any salvage should leave residual snags and logs at levels and size distributions that emulate those following pre-settlement, stand-replacing fires. Scientific information applicable to local conditions should be the basis for determining those levels.

<u>Steep Slopes (outside of PACs)</u>

1. Within mixed-conifer and pine-oak types, allow no harvest of trees >22.4 cm (9 inches) on any slopes >40% where timber harvest has not occurred in the past 20 years. (Mixed-conifer and pine-oak types found on steep slopes that have been treated within the past 20 years are managed under restricted habitat guidelines.)

2. These guidelines also apply to the bottoms of steep canyons.

3. Thinning of trees <22.4 cm (9 inches) dbh, treatment of fuels, and fire are allowed as described above for PACs.

4. No seasonal restrictions apply.

5. Prescribed natural fire is also permitted as is the creation of fire breaks on a case-specific basis.

6. On steep slopes treated to reduce fire risk, either by the use of prescribed fire alone or in conjunction with removal of stems and ground fuels, pre- and post-treatment monitoring of habitat conditions should be done. Specific habitat characteristics to be measured include fuel levels, snag basal area, volume of large logs (>30 cm midpoint diameter), and live tree basal area.

Restricted Habitat

Restricted habitat includes general restricted habitat, target/threshold habitat, and riparian.

<u>Restricted Habitat – General</u>

Management activities that influence the owl and its habitat should be conducted according to the following overriding guidelines:

1. Manage mixed-conifer and pine-oak forest types to provide continuous replacement nest habitat over space and time. Treatment of a particular stand depends on its capability to attain the desired stand conditions. Target stand structure would be the described conditions for nesting and roosting habitat (Table III.B.1) but only the portion of the landscape that can be sustained through time should be in that condition.

2. Incorporate natural variation, such as irregular tree spacing and various stand/patch sizes, into management prescriptions and attempt to mimic natural disturbance patterns.

3. Maintain all species of native vegetation in the landscape, including early seral species. To allow for variation in existing stand structures and provide species diversity, both uneven-aged and even-aged systems may be used as appropriate.

4. Allow natural canopy gap processes to occur, thus producing horizontal variation in stand structure.

The specific guidelines are:

1. Emphasis should be placed on unevenaged management systems. Existing stand conditions will determine which silvicultural system is appropriate.

2. Extend rotation ages for even-aged stands to >200 years. Silvicultural prescriptions should explicitly state when vegetative manipulation will cease until rotation age is reached. This age may depend on site quality, but ceasing activity at 140 years and allowing 60 years for unaltered stand maturation and senescence seems reasonable.

3. Within pine-oak types, emphasis should be placed on management that retains existing large oaks and promotes the growth of additional large oaks.

4. *Original*: Retain all trees >61 cm [24 in] dbh. *As modified per a June 13, 2001, clarification memo*: Retain trees >61 cm (24 inches) unless overriding management situations require their removal to protect human safety and/or property (for example, the removal of hazard trees along roads, in campgrounds, and along power lines).

5. *Original*: Retain hardwoods, large down logs, large trees, and snags. *As modified per a June 13, 2001, clarification memo*: Except for treatments designed to reduce the risk of catastrophic wildfire described below, retain hardwoods, large down logs, large trees [>45 cm (18 inches)], and snags. Design and implement fuels-reduction (including thinning) treatments within restricted areas so that hardwoods, large down logs, large trees [>45 cm (18 inches)] and snags are retained to an extent that does not significantly impede the overriding objective of reducing the risk of catastrophic wildfire in owl habitat. When implementing this guideline, compromises should always balance (1) retaining a sufficient density and distribution of important features that spotted owls may require when foraging outside protected areas and (2) reducing the risk of losing existing nesting/roosting habitat or delaying the development of target/threshold conditions as a result of catastrophic fire. The requirements for target/threshold stands discussed under Coarse Filter and Fine Filter and in guideline number 7 still apply.

6. Management priority should be placed on reducing identified risks to spotted owl habitat. Thinning from below may be desirable or necessary before burning to reduce ladder fuels and the risk of crown fire. Such thinning must emphasize irregular tree spacing.

7. No stand that meets threshold conditions can be treated in such a way as to lower that stand below those conditions. Treatments can occur as long as stand-level conditions remain at or above the threshold values of Table III.B.1.

<u>Target/Threshold</u>

Target/threshold stands where all conditions are met simultaneously and the "next best" stands that are necessary to make up the deficit of target/threshold stands (the 25 % of the area referred to below), as required by Table III.B.1 of the MSO recovery plan, have been designated and mapped on the Williams and North Kaibab Ranger Districts. However, it is not clear if the 10% of the area referred to below has been identified and designated; designation needs to be completed if it has not already been done. The following guidelines, which are from Table III.B.1, are to be applied to those stands.

Forest Type	Percent of Area	Percent Stand Density of trees 12-18 inches dbh	Percent Stand Density of trees 18-24 inches dbh	Percent Stand Density of trees >24 inches dbh	Tree Basal Area (square feet/acre)	Density of Trees >18 inches dbh (trees/acre)
Mixed conifer	25	10	10	10	150	20
Mixed conifer	10	10	10	10	170	20
Pine-oak	10	15	15	15	150	20

In addition, for pine-oak, 20 square feet/acre of oak > 5 inches in diameter at root crown, and retention of all oaks >5 inches dbh, must be provided as a target/threshold condition.

Translation of Table III.B.1 is as follows. Twenty-five percent of the mixed conifer in each District is to consist of stands that have tree basal area of 150 square feet and include 20 trees/ acre that are >18 inches dbh. There is to be an even distribution of stand density across all sizes classes with no less than 10% of the distribution of stand density in each of the upper three size classes: 12-18 inches, 18-24 inches, and >24 inches. In addition, ten percent of the mixed conifer (a subset contained within the twenty-five percent discussed above) in each District is to have >170 square feet/acre of basal area in addition to the large trees and distribution of trees by size class. Ten percent of the pine-oak in each District is to consist of stands that have tree basal area of 150 square feet and include 20 trees/ acre that are >18 inches dbh. There is to be an even distribution of stand density across all sizes classes with no less than 15% of the distribution of stand density in each of the upper three size classes. Target/threshold conditions for pine-oak also require that >20 square feet of oak basal area > 5 inches in diameter at root crown, and that all oaks >5 inches dbh, be retained.

No stand that meets threshold conditions or has been designated as a target/threshold stand can be treated in such a way as to lower that stand below those conditions . That is, activities can occur within stands that exceed these conditions, but the outcome of such activities cannot lower the stands below the threshold levels given in Table III.B.1. Target/threshold stands are to be managed to achieve target conditions as rapidly as possible.

<u>Riparian</u>

1. Maintain riparian broad-leaved forests in a healthy condition where they occur, especially in canyon-bottom situations.

2. Restore lowland riparian areas.

3. Emphasize a mix of size and age classes of trees. The mix should include large mature trees, vertical diversity, and other structural and floristic characteristics that typify natural riparian conditions.

Summary of Management Guidelines for Mexican Spotted Owl Critical Habitat

Mexican spotted owl critical habitat is all of the MSO habitat that occurs in designated MSO critical habitat units. The Kaibab National Forest includes all or parts of four critical habitat units. Those units are UGM-13, UGM-15, UGM-17 (units 13, 15, and 17 of the Upper Gila Mountains Recovery Unit), and CP-10 (unit 10 of the Colorado Plateau Recovery Unit).

The management guidelines from the Mexican Spotted Owl Recovery Plan are to be implemented for all MSO habitat that is also designated as MSO critical habitat.

MSO critical habitat includes forested and canyon habitat. The respective primary constituent elements (PCEs) are to be retained and maintained in all designated MSO critical habitat.

Forested MSO Critical Habitat PCEs

Primary constituent elements related to forest structure are:

1. A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45

percent of which are large trees with a trunk diameter of 12 inches (0.3 meters) or more when measured at 4.5 feet (1.4 meters) from the ground.

2. A shade canopy created by the tree branches covering 40 percent or more of the ground.

3. Large dead trees (snags) with a trunk diameter of at least 12 inches (0.3 meters) when measured at 4.5 feet (1.4 meters) from the ground.

Primary constituent elements related to maintenance of adequate prey species are:

1. High volumes of fallen trees and other woody debris.

2. A wide range of tree and plant species, including hardwoods.

3. Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.

Canyon MSO Critical Habitat PCEs

Canyon habitat used for nesting and roosting is typically characterized by cooler conditions found in steep, narrow canyons, often containing crevices, ledges, and/or caves. These canyons frequently contain small clumps or stringers of ponderosa pine, Douglas-fir, white fir, and/or pinyon-juniper. Deciduous riparian and upland tree species may also be present. Adjacent uplands are usually vegetated by a variety of plant associations including pinyon-juniper woodland, desert scrub vegetation, ponderosa pine- Gamble oak, ponderosa pine, or mixed conifer. Owl habitat may also exhibit a combination of attributes between the forested and canyon types.

Primary constituent elements related to canyon habitat are:

1. Presence of water (often providing cooler and often higher humidity than the surrounding areas).

2. Clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and/or riparian vegetation.

3. Canyon wall containing crevices, ledges, or caves.

4. High percent of ground litter and woody debris.

Relevant Portions of Clarification Memos to the MSO Recovery Plan

June 5, 2000: Use of Roost Locations for Defining Nest Buffers in PACs

The Recovery Plan recommended establishment of 100-acre "no treatment" buffers around known nest locations when conducting fuels-reduction treatments in PACs. The following methodologies, in priority order, are appropriate for delineation of nest buffers when planning fuels-reduction treatments in PACs.

1. Ecologically delineated around a known nest from any year.

2. Either an ecologically-delineated or circular buffer around a location of a young-of-the-year record from any year.

3. An ecologically-delineated buffer, around two or more locations in at least two different years, of daytime-roosting owls of any age.

June 13, 2001: Removal of some Reserved Lands from Protected Status

Interpretation of the clarification:
Some cover types (i.e., grasslands, pinyon-juniper, pure ponderosa pine, spruce-fir, aspen) within reserved areas (e.g., wilderness) should not be considered protected MSO habitat just because they are in reserved areas. However, the recovery plan recommendations for the cover types (mixed conifer, pine-oak, riparian) that constitute protected, restricted, and other forest and woodland types apply range-wide regardless of their status regarding reserved lands.