Four Forest Restoration Initiative

Recreation Specialist Report

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Relevant Laws, Regulations and Policy

Multiple statutes, regulations and executive orders identify the general requirement for the application of economic and social evaluation in support of Forest Service planning and decision making. These include, but are not limited to, the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215: 16 USC 528-531), National Environmental Policy Act of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 43414347), and the National Forest Management Act of 1976 (16 U.S.C. 1600).

- The Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215: 16 USC 528-531) requires that economic impacts are considered when establishing management plans or decision that may affect the management of renewable forest and rangeland resources. This report meets the requirements of this law by specifically considering the economic impacts of the implementation of the Travel Management Rule to local communities.
- National Environmental Policy Act (NEPA) of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 43414347) requires that economic and social impacts of Federal actions be considered through environmental analysis. This specialist report includes analysis on social and economic issues identified during the scoping process to meet the terms of the NEPA and regulations.
- National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600) and regulations require that the economic impacts of decisions or plans affecting the management of renewable resources are analyzed and that economic stability of communities whose economies are dependent on materials from national forest lands are considered. This analysis meets the requirements of the NFMA by specifically considering the economic impacts of the implementation of the 4FRI project and its impacts on local communities and minority populations.
- Wilderness Act of 1964 (16 USC 1131 et seq.) provides the legal definition, area designations, and protections for Designated Wilderness Areas. This specialist report considers proposed management activities in a potential wilderness.
- Wild and Scenic Rivers Act of 1968 (16 USC 1273) protects rivers from development that would change their character. This specialist report considers proposed management activities in a potential wild and scenic river.
- Federal Cave Resources Protection Act of 1988 (16 U.S.C. 4301–4309) provides the basis for identifying and managing significant caves on National Forest System lands.
- National Trails System Act of 1968 (16 USC 1241) provides for establishment and management of national scenic, historic and recreation trails. This specialist report includes analysis of the Arizona National Scenic Trail, and mitigations for Beale Wagon Road and the Overland National Historic Trails.

Forest Service Manuals

- 2310.1 - Authority. Recreation planning on National Forest System lands is an integral part of Forest land and resource management planning as

required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by the National Forest Management Act (NFMA) of 1976, and described in 36 CFR 219 and FSM 1920. The specific requirements of recreation resource planning are set forth at 36 CFR 219.21.

- 2310.3 - Policy. In addition to general planning policy presented in 36 CFR 219.1, FSM 1903, FSM 1920.3, FSM 1922.03, and FSM 2303.
    - Use the Recreation Opportunity Spectrum (see existing conditions for a summary of the ROS classes) to establish planning criteria, generate objectives for recreation, evaluate public issues, integrate management concerns, project recreation needs and demands, and coordinate management objectives.
- 2320 Wilderness Management – Policy
    - Where there are alternatives among management decisions, wilderness values shall dominate over all other considerations except where limited by the Wilderness Act, subsequent legislation, or regulations.
- 2350 – Trail, River, and Similar Recreation Opportunities - Policy.
    - Consider trail management in the context of an administrative unit or Ranger District.
    - 2353 Administration of National Recreation, Historic and Scenic Trails
        - 1.b. National Scenic Trails. These extended trails are located so as to provide for maximum outdoor recreation potential and for conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which these trails pass (16 U.S.C. 1242(a)(2).
        - 1.c. National Historic Trails. These trails follow as closely as possible a route of historic significance, so as to protect the route and its artifacts for public use and enjoyment.
        - 2. Ensure that management of each trail in the National Trails System addresses the nature and purposes of the trail and is consistent with the applicable land management plan (16 U.S.C. 1246 (a)(2)).
    - 2353.11 – Relationship Between National Recreation, National Scenic, and National Historic Trails and NFS Trails
        - Manage National Recreation, National Scenic, and National Historic Trails as NFS trails. Administer each National Recreation, National Scenic, and National Historic Trail corridor to meet the intended nature and purposes of the corresponding trail (FSM 2353.31)
    - 2353.41 – Objectives
        - Develop and administer National Scenic and National Historic Trails to ensure protection of the purposes for which the trails were established and to maximize benefits from the land.
- 2370 – Special Recreation Designations - Policy
    - Manage each special area as an integral part of the National Forest System

with emphasis on the primary values and resources as directed by the law that established the area.

Wilderness.net, Rivers.gov, and NationalTrails.org were also used in order to review information about the laws and regulations regarding wilderness, wild and scenic rivers, and national trails as well as management guidance for Forest Service designations.

Kaibab Revised Forest Plan Direction for Recreation is found in Table 1. These became effective in April 2014.

Table 1 Revised Kaibab Forest Plan direction for recreation and scenery, (USDA-Forest Service 2014)

Section	Plan Direction	Page Number
Chapter 2 Forest Wide Desired Conditions and Strategies	The ponderosa pine forests are popular places to escape the heat in the summer and are the setting for many recreation activities including camping, hunting, hiking, sightseeing, and wildlife watching.	16
Aspen	Aspen also has high scenic value. The green leaves and white trunks of aspen provide a natural contrast to the surrounding forest. Aspen attracts both residents and visitors to northern Arizona to enjoy abundant wildlife, shade, and scenery… Aspen provides unique and seasonal opportunities for hiking, biking, bird watching, nature exploration, picnicking, and other recreational activities.	27
Desired Condition – Aspen	Aspen provides opportunities for scenic enjoyment, recreation, and cultural or spiritual experiences.	28
Guidelines – Activities Following Large-Scale Disturbances	The "Kaibab NF Recreation Opportunity Settings and Scenery Management Guidebook"5 should be used when designing restoration projects.	32
Natural Waters	In addition, springs provide cultural and recreational opportunities.	45
Constructed Waters	Some constructed waters provide unique riparian habitats and recreation opportunities.	47
Desired Conditions – Constructed Waters	Desirable nonnative fish species provide recreational fishing opportunities in reservoirs and lakes consistent with the needs of native species.	48
Desired Conditions – Wildlife	Human-wildlife conflicts are minimal. Hunting, fishing and other wildlife based recreation opportunities exist, but do not compromise species populations or habitat.	49
Caves, Karst, and Mines	Many caves also have important traditional cultural significance to area tribes. Due to these and other resource concerns, there are no caves on the Kaibab NF currently identified as appropriate for recreational activities.	57
Guidelines – Caves, Karst, and Mines	Project design should include protections for subsurface geologic features to minimize disruptions to cave microbiology and other aspects of cave ecology.	57
Guidelines – Traditional Cultural Properties	Development of new facilities and commercial and recreational activities should be minimized in TCPs.	61
Recreation and Scenery	The natural, cultural, and scenic environments of the Kaibab NF offer settings for a wide range of high-quality recreation opportunities…Scenic areas and associated outdoor recreation provide places to hike, bike, fish, hunt, view	62

	wildlife, drive for pleasure, and enjoy the peace, quiet, and spiritual values of nature.	
Desired Conditions – Recreation and Scenery	A wide spectrum of high-quality recreation settings exists. Users have access to a variety of developed and dispersed opportunities.	63
Desired Conditions – Front Country	Front-country areas provide initial contact points for forest users and developed recreation settings where people can engage in a variety of recreation activities including scenic driving, hiking, camping, picnicking, fishing, and boating. Motorized and nonmotorized recreation opportunities are available.	64
Desired Conditions – Back Country	Back-country areas are mostly undeveloped places where people engage in a variety of more primitive recreation activities. Visitors rely on their outdoor skills and provide their own equipment as they engage in recreation activities.	64
Guidelines – Recreation and Scenery	The "Kaibab NF Recreation Opportunity Spectrum and Scenery Management Handbook" (USDA 2004)18 and "Built Environment Image Guide" should be used for recreation management and project design.	66
Desired Conditions - Transportation and Forest Access	Forest roads, bridges, and trails provide safe, legal, and reasonable access for recreation opportunities and resource management.	76
Arizona National Scenic Trail	The Arizona National Scenic Trail is a nonmotorized, primitive trail that stretches over 800 miles from Mexico to Utah across Arizona…It showcases the State's diverse life zones and scenery.	93
Desired Conditions – National Scenic and Recreation Trails	Views in the immediate foreground (0 to 300 feet) of national scenic and recreation trails include natural-appearing landscapes. The landscapes have high scenic values and generally appear unaltered by human activities. Signage helps users find nearby developed sites, trailheads, recreation facilities, and drinking water sources. User conflicts between differing recreational uses are infrequent. In remote areas, the sights and sounds of roads, motorized trails, utility corridors, and other facilities are rarely encountered. The Arizona National Scenic Trail provides both short and long-distance nonmotorized recreation opportunities in mainly remote and primitive settings representative of the dramatic natural landscapes and varied vegetation of Arizona. Along most of the Arizona National Scenic Trail, infrastructure and facilities are few and are constructed in such a way as to be compatible with the scenic, natural, historic, and cultural qualities for which the trail was established. Connecting or side trails may provide access to developed areas and amenities.	94
Guidelines – National Scenic and Recreation Trails	Projects should preserve the recreation opportunity setting for any affected segments, particularly within ½ mile of the Arizona National Scenic Trail.	94
Desired Conditions – Developed Recreation Sites	Developed campgrounds are places where structures and human impacts on vegetation may be seen, but they do not dominate the view or attract attention (low to moderate scenic integrity). • Human activities in the areas visible from campgrounds (foreground to middle ground, 300 feet to 4 miles) do not attract attention or stand out, and the landscapes appear natural (moderate to high scenic integrity).	99
Guidelines – Developed Recreation Sites	Developed recreation site vegetation management plans should guide tree removal and burning activities in the campgrounds.	100

Coconino Forest Plan direction for recreation is found in Table 2 and Draft Revised Forest Plan Direction is found in Table 3.

Table 2 Recreation direction in the Coconino Forest Plan (USDA-Forest Service 2008).

Section	Plan Direction	Page Number
Goals	Manage the recreation resource to increase opportunities for a wide variety of developed and dispersed experiences. Preserve and protect non-renewable cave resources so their scientific and aesthetic value does not diminish.	22
Forest-wide and Management Area Standards and Guidelines	Use the ROS inventory to analyze impacts to ROS classes due to management activities such as timber sales, range projects and firewood sales. Surface land management decisions include consideration of potential impacts to all cave resources. Any management activity planned near or within a known cave area is examined for its potential impacts to caves and karst features. Cave entrances and karst features are also not to be used as disposal sites for slash, waste rock or fill materials, and other refuse. Evaluate a 300-foot radius around cave entrances for the effect on cave resources. The Arizona Trail is a state-wide trail of which a portion traverses the Coconino NF. This trail will be a non-motorized pathway. Dispersed Recreation: other areas may be seasonally closed to provide opportunities for recreation in a setting without vehicular disturbance such as temporarily changing the ROS class social and managerial settings toward the primitive end of the spectrum. Initially, the Pine Grove and Rattlesnake areas, or approximately 12,600 and 11,100 acres, respectively are closed annually from August 15 through December 31.	51 51-2 59
MA 17	Rocky Gulch proposed RNA is located in the Beaver Creek Watershed. The area contains 950 acres of old-growth ponderosa pine and was one of the control watersheds for research in the Beaver Creek Watershed. The 150 acres G.A. Pearson RNA was established in 1950…management decisions for the experimental forests are not made in this forest plan. Emphasize and protect watershed conditions and maintain natural ecological conditions on the Research Natural Areas (RNA's) so that they are available for research and education that does not disturb the areas' natural condition. …There is no harvest of timber products,	Replacement page 193 Replacement page 194

	including firewood. Use prescribed fire with planned ignitions as a management tool provided its use is compatible with the management of specific area. Suppression tactics minimize damage to the character of the RNA's and all other special areas.	
Flagstaff/Lake Mary Ecosystem Analysis Area-wide Goals, Objectives, Standards and Guidelines	Goals and Objectives: there is a range of recreational setting opportunities for people to enjoy the area's many scenic and aesthetic qualities. The diversity and quality of recreation opportunities, settings, and experiences are within acceptable limits of change to ecosystem stability and condition. Guidelines: ROS objectives guide management. Manage for social encounters, signing, scenery, and a sense of exploration that meets ROS objectives. Management activities should generally comply with the requirements of the adopted ROS classes on the Objectives for Recreation Opportunity Spectrum map. (This includes an increase in opportunities for semi-primitive non-motorized and semi-primitive motorized ROS experiences to better manage the high demand for this type of recreation setting.)	New page 206-62
Goals and Objectives	Camping: dispersed campsites are maintained to protect forest resources and maintain visitor experience. Rock Climbing: rock climbing areas are managed and maintained for appropriate experience, natural settings, attributes and conditions, considering ROS objectives, wildlife, heritage and soil and water resources. Non-motorized Trails: There are opportunities for a variety of trail experiences and challenges that are consistent with protection of sensitive resources, meet the needs of a diverse public emphasize the natural environment, and meet ROS objectives.	New page 206-63 New page 206-66 New Page 206-67
Guidelines	Roads and off-road driving: conduct obliteration and re-vegetation work as funds become available. When choosing areas to conduct road maintenance and obliteration, focus efforts in semi-primitive motorized and semi-primitive non-motorized areas. Of the semi-primitive motorized and semi-primitive non-motorized areas, consider Lake Mary and Oak Creek Watersheds as priorities for water quality reasons. Also focus work adjacent to the National Monuments.	New page 206-72
Forestry Goals and Objectives	Grass, forbs, and shrubs on the forest floor contribute to the biological diversity of the ponderosa pine forest. Fire should continue to play a natural ecological role within the constraints of human health and safety.	Replacement page 206-75
MA 31 Management	Maintain semi-primitive motorized ROS settings throughout the MA,	Replacement

Emphasis	with Roaded Natural corridors in between.	page 206-84
MA 32 Management Emphasis	Progress towards the setting…this includes expanding the current semi-primitive motorized areas…Maintain the roaded natural settings along passenger car corridors and the large KV electric line.	Replacement page 206-88
MA 33 Management Emphasis	Reintroduce fire's natural role as much as possible. Balance recreation demands with protection of soils, water and vegetation. Restore natural grasslands… Expand semi-primitive motorized settings in other areas and continue roaded natural corridors along major roads. Focus road and trail rehabilitation work on the large cinder cones, in meadows and grasslands where impacts are occurring to soil, plants and cultural sites.	Replacement page 206-91 Replacement page 206-92 Replacement page 206-93
MA 35 Management Emphasis	Per the objectives for ROS map, expand semi-primitive motorized areas and maintain roaded natural corridors along major roads. New semi-primitive non-motorized patches should be created on Mormon Mountain in sensitive species habitat. Continue current seasonal motorized restrictions in the Pinegrove Seasonal Closure Area. Continue the current non-motorized Arizona Trail corridor through the MA.	Replacement page 206-98 Replacement page 206-99 Replacement page 206-100
MA 36 Management Emphasis	Per the objectives for ROS map, maintain the semi-primitive non-motorized setting in the Dry Lake Hills and expand the semi-primitive non-motorized setting below the waterline Road. Expand semi-primitive motorized settings in the remainder of the MA with roaded natural corridors along major roads.	Replacement pages 103-104
MA 37 Management Emphasis	Provide recreational opportunities. Maintain the quality of the recreation experience throughout this MA. Expand semi-primitive non-motorized settings on Campbell Mesa, around Walnut Canyon, in the Skunk/Fay Canyon area and northwest of Fisher Point.	Replacement page 206-108
MA 38 Management Emphasis	Along Woody Ridge there are large tracts of un-fragmented habitat and remote recreation opportunities including semi-primitive motorized and non-motorized ROS settings with roaded natural corridors. Per the objectives for ROS map, maintain semi-primitive non-motorized settings on portions of Woody Ridge, A-1 Mountain and west of A-1 Mountain. In the remainder of NFS lands, maintain patches of semi-primitive motorized habitat with roaded natural corridors along major	Replacement page 206-114

	roads or in smaller NF inholdings.	

Table 3. Draft Coconino Revised Forest Plan direction for recreation and scenery (USDA Forest Service 2013).

Section	Plan Direction	Page Number
Chapter 2 Desired Conditions – Wetlands/Cienega, Reservoirs/Lakes	Wetlands provide water storage, wildlife habitat, recreation, fisheries, and livestock watering.	24
Chapter 2 Desired Conditions – Caves, Cliffs, and Talus Slopes	Significant cave resources' aesthetic, cultural, and scientific values remain intact and are protected from damage.	28
Guidelines – Caves, Cliffs and Talus Slopes	To prevent siltation into sinkholes, cave entrances, collapse of cave passageways, and alteration of the chemical, physical, and biological conditions of the cave resource, project design should include protections for cave entrances and subsurface geology, where they occur. A radius of 200 feet should be used for restrictions on activities[11] that can alter the cave's resources, functions and associated features unless site-specific adjustments are made based on topography, drainage, soil type, and the expected impact of the proposed activity.	29
Desired Conditions – Forest Products	Silvicultural timber cutting techniques are designed to integrate considerations for socioeconomic values, water quality, soils, wildlife habitat, recreation opportunities, visual quality, and other values, while providing opportunity for a sustainable and appropriately scaled industry.	81
Desired Conditions – Dispersed Recreation	The diverse landscapes of the Coconino NF offer a variety of settings for a broad range of recreational opportunities in all seasons and a place for visitors to escape into natural, wild places. As development and population in the region continue to grow and new forms of recreation emerge, recreation settings on the Coconino NF are stable, retaining their natural character. Loss of remote, undeveloped settings does not occur in semiprimitive and primitive settings. Recreation activities are balanced with the ability of the land to support them and create minimal user conflicts. Non-recreation activities that take place have minimal effect on recreation activities. For example, thinning projects do not result in slash piles that block trails, and projects that temporarily impact trails are followed up with trail restoration. Resource damage from unauthorized motorized trails is minimal and unauthorized trails are rehabilitated to prevent future access by the public and to mitigate long term soil and water impacts.	103-104
Desired Conditions – Dispersed Recreation	Most motorized dispersed camping areas are not overcrowded, and their naturalness is maintained. Historic trails, such as Beale Wagon Road, Chavez Road, and logging railroad grades, are preserved and adapted for contemporary use.	105
Guidelines – Dispersed	In designated dispersed camping sites and corridors, mature overstory should be retained to provide shade and screening around hardened	108

Recreation	sites in order to preserve the recreation setting.	
Standards – Pine Belt MA	Gambel oak and aspen provide a desirable visual contrast to the evergreen pine in fall. In winter, this management area provides recreationists a white, snow-covered landscape that contrasts with evergreen trees. In the summer, it provides cool shady areas for a variety of recreation activities. Arizona walnut trees in Walnut Canyon provide a valued scenic feature in this management area that contributes an interesting bark and texture against the winter sky and yellow fall color.	119
Guidelines – Arizona National Scenic Trail	Fire on, or in, the foreground of the ANST should be managed using minimum impact suppression tactics, or other tactics appropriate for the protection of values and resources for which the trail was designated. Forest health projects should be managed to minimize long term visual impacts within and adjacent to the ANST corridor.	161
Suitability – Recreation and Transportation Suitability	Table [below]displays areas that are suitable or not suitable for motorized uses, including new motorized areas, roads, motorized trails, temporary or permanent road construction, and mechanized travel and nonmotorized travel. These areas were determined based on the activities appropriate for the Recreation Opportunity Spectrum allocation and for special areas, given law, regulation, policy, and desired conditions.	174-

ROS/Special Area Designation	New Motorized Areas	NFS Roads and Motorized Trails >50"	NFS Motorized Trails <50"	Temporary Roads	Permanent Roads	Mechanized Travel	Non-motorized Travel
Urban and Rural ROS	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable
Roaded Natural ROS	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable
SPM ROS	Not Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable
SPNM ROS	Not Suitable	Not Suitable	Not Suitable	Suitable	Not Suitable	Suitable	Suitable
Primitive ROS	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable	Suitable
Recommended RNA	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable
RNA	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable
Botanical and Geological Areas	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable
Environmental Study Areas	Not Suitable	Not Suitable	Not Suitable	Suitable	Not Suitable	Suitable	Suitable
Recommended Wilderness	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable	Suitable
Wilderness	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable
Eligible or Designated WSR – Recreation and Scenic	Not Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable
Eligible or Designated WSR – Wild	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable	Suitable

[1] ROS = Recreation Opprtunity Spectrum; SPM = Semiprimitive Motorized; SPNM = Semiprimitive Nonmotorized; RNA = Research Natural Area; WSR = Wild and Scenic River.

Methodology

Recreation use by activity

Estimates of recreation use are derived from the National Visitor Use Monitoring (NVUM) surveys done on the Coconino and Kaibab NF in 2010 (USDA Forest Service 2012, USDA Forest Service 2012c). These inventories are conducted for all national forests on a 5 year cycle that started for both forests in 2000. The most recent 2010 NVUM surveys are the basis for determining present recreation use, satisfaction, origin of users, substitution behaviors and demand. Comparisons between 2005(USDA Forest Service 2012b and USDA Forest Service 2012d) and 2010 NVUM data are used to indicate changes in recreation use in the last five years.

The NVUM is a highly useful data source because it is based on study design specifically meant to provide data to forest managers to infer recreational use and patterns on the Forest. This data source is also based on site-specific surveys, which means the estimates are based on actual activities users actually have participated in at the time of the survey rather than those activities

that users report they have once or will participate in at some unidentified time and location.

The site-specific data collection methodology used for NVUM also has its drawbacks. The NVUM methodology often depends on locating data collection points at major access points to the Forest such as main intersections or developed recreational facilities (USDA Forest Service. 2012, USDA Forest Service 2012c). This means that the survey may be more likely to collect data from Forest visitors who use these sites more often or visitors that do not have or know of less used access points. For example, the NVUM dataset is very unlikely to include information from local landowners or local residents who access the Forest from their private lands or from lesser known or less accessible access points.

In addition to NVUM data, data from the National Recreation Survey series (Cordell et al 2009) was used. It provides longer term information (starting in 1980's and continuing about every 5 years). This information is based on in-the-home surveys of outdoor recreation participants by phone and includes lifestyle profiles that help improve the understanding of the attitudes and values of participants. The National Recreation Survey (NRS) asks many questions similar to NVUM, as well gathering information about a more extensive list of recreation activities. Twenty years of data provides a more reliable comparison when assessing trends and changes in recreation participation than 10 years of NVUM. The "participants contacted" utilizes data based on a sample of demographics across Arizona. The sample may reach a greater number of recreation participants than the NVUM since it is not dependent upon interviewing a person at a specified location on a sample day.

The NVUM data indicates that the majority of users on both forests are from the Phoenix metro area. The State level data from the Arizona Statewide Comprehensive Outdoor Recreation Plan< or SCORP (Arizona State Parks 2008). The SCORP data includes information on the activities and frequency of participation as well as user reported activities that are likely increase in the future is useful when analyzing projects that could affect these users. Future participation predictions are helpful when analyzing potential management activities that could affect users.

All three of these data sources provide somewhat different data sets. All three are consistent in showing primary activities in which visitors to the Coconino and Kaibab participate and the source/origin of their trips. Each provides study specific information that is also useful in analysis.

The Recreation Opportunity Spectrum (USDA Forest Service 1982, 1986) provides a framework for defining classes of recreation environments, activities and experience opportunities. ROS is used on NFS lands to determine the type of recreation opportunities that may be provided in different areas. The spatial distribution of ROS classes allows the agency to supply different kinds of recreation opportunities to its diverse recreating public. Forest recreation management is based on the experience opportunities provided by the physical, social and managerial settings of the land and recreation activities which occur in the settings.

The ROS uses six major classes: Urban, Rural, Roaded Natural, Semi-Primitive Motorized, Semi-Primitive Non-Motorized, and Primitive. The CNF Forest Plan uses these classes. ROS is flexible and can be further subdivided as need arises (USDA 1986). The KNF chose to subdivide and use Roaded Modified and to distinguish between Semi-Primitive Non-Motorized Wilderness and Semi-Primitive Non-Motorized when the ROS maps were updated and the Forest Plan was amended in 2004.

Forest Service Handbooks and Manuals provide information and management guidance regarding special places such as Wilderness, Wild and Scenic Rivers, Research Natural Areas, and recreation sites.

Changes from the Draft Environmental Impact Statement

As noted in the Final Environmental Impact Statement, 40 CFR CEQ 1503.4 directs an agency to review, analyze, evaluate and respond to substantive comments on the draft EIS. It direct an agency preparing a final environmental impact statement to assess and consider comments both individually and collectively and to respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to:

> (1) Modify alternatives including the proposed action.
>
> (2) Develop and evaluate alternatives not previously given serious consideration by the agency.
>
> (3) Supplement, improve, or modify its analyses.
>
> (4) Make factual corrections.
>
> (5) Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

Since the publication of the DEIS, the Forest Service: (1) identified two additional issues, (2) developed a new alternative (Alternative E) which proposes no forest plan amendments, (3) considered but eliminated an evidence-based full restoration alternative, (4) revised treatment acres for all action alternatives based on monitoring results that identified new Mexican spotted owl protected activity centers (PACs), modified existing PAC boundaries, and identified new northern goshawk post-fledgling family areas (PFAs), (4) removed treatment acres which overlapped with other ongoing NEPA analyses (such as the Flagstaff Watershed Protection Project), (5) corrected technical errors, (6) clarified methodology, updated environmental consequences (including cumulative effects), (7) revised, further developed and analyzed or corrected appendix B-G, (8) conducted additional analyses based on public comments on the DEIS in the preparation of this FEIS, (9) responded to opposing science, and (10) removed all proposed forest plan amendments for the Kaibab NF (see discussion below). The description of the action alternatives in chapter 2 of the FEIS incorporates these updates.

In February of 2014 a revised Land and Resource Management Plan for the Kaibab National Forest became effective. The FEIS was updated to reflect new management areas and a consistency crosswalk between the revised plan and the analysis (including proposed plan amendments) was conducted. Appendix J (Volume 1) lists all changes in the document from DEIS to FEIS.

Changes to the Recreation Specialist Report in addition to those discussed above. These include:

- Corrections to acreages of treatment areas and corresponding GIS analysis for recreation opportunity spectrum acres adjustments for all alternatives.

  Data is typically reported to the nearest acre, mile, or percentage. Most values have been rounded from their actual decimal values. Totals were calculated before any values were rounded in order to give the most accurate sum. Any apparent inconsistency between the total values reported in a table and a sum resulting from adding up individual values in a table typically accounts for a discrepancy of about 1% in the case of rounding percentages or miles, and <2 acres in the case of acres.

In an attempt to avoid confusion over these kinds of inconsistencies, minor adjustments to the numbers in the EIS document were made to allow for numbers in tables to add up correctly as displayed. As a result, some numbers may not be exactly the same in the EIS document as compared to this report. The numbers in this report are the most accurate and any differences do not alter any determination of effects.

- Addition of Alternative E analysis
- Removal of 1988 Kaibab NF Forest Plan direction for recreation
- Addition of 2014 Kaibab NF Revised Forest Plan direction for recreation and removal of reference to and analysis of 1988 Kaibab NF Forest Plan amendments.
- Addition of 2013 Draft Coconino NF Revised Forest Plan direction for recreation. This includes updated recommended wilderness information for the preferred alternative (modified alternative B)
- Corrections to web addresses of citations if incorrect.
- Changed conditions as result of the May 2014 Slide Fire. For no burn areas within the fire boundary where mechanical and fire treatments would continue, there is no change to effects analyzed for the alternatives.

  There will be some locations where treatments would not occur or are changed depending on effects from the fire. Figure 1 provides a map of mortality from the Slide Fire compared to the 4FRI boundary. Where there was low severity burn, nutrient cycling would occur, most trees would survive, and groundcover plants and shrubs would green up over time. The fire would count as one burn cycle, and a follow up burn would occur after the area recovers. It may still be necessary to thin some live trees if they do not meet the desired conditions. Effects would be as analyzed for mechanical treatment by alternative later in the report. Some individual trees or small pockets of trees may have been killed and would eventually fall over. There may be some places where standing dead trees need to be removed to alleviate hazardous conditions at trailheads or where individual hazard trees need to be removed as necessary either side of trails.

  In areas of moderate severity, there will be more of a mix of live trees and dead trees and pockets of dead trees may be larger. Dead trees will fall down over time. There may be some places where standing dead trees need to be removed to alleviate hazardous conditions at trailheads or where individual hazard trees need to be removed as necessary either side of trails. Evaluation of stands will determine if any further treatments (thinning or later prescribed fire) would occur.

  In areas of high severity, treatments would not occur, and these areas would not be disturbed or minimally disturbed. No subsequent burning would occur. There may be some places where standing dead trees need to be removed to alleviate hazardous conditions at trailheads or where individual hazard trees need to be removed as necessary either side of trails.

- Clarifications or minor edits as a result of comments received and in response to

comments

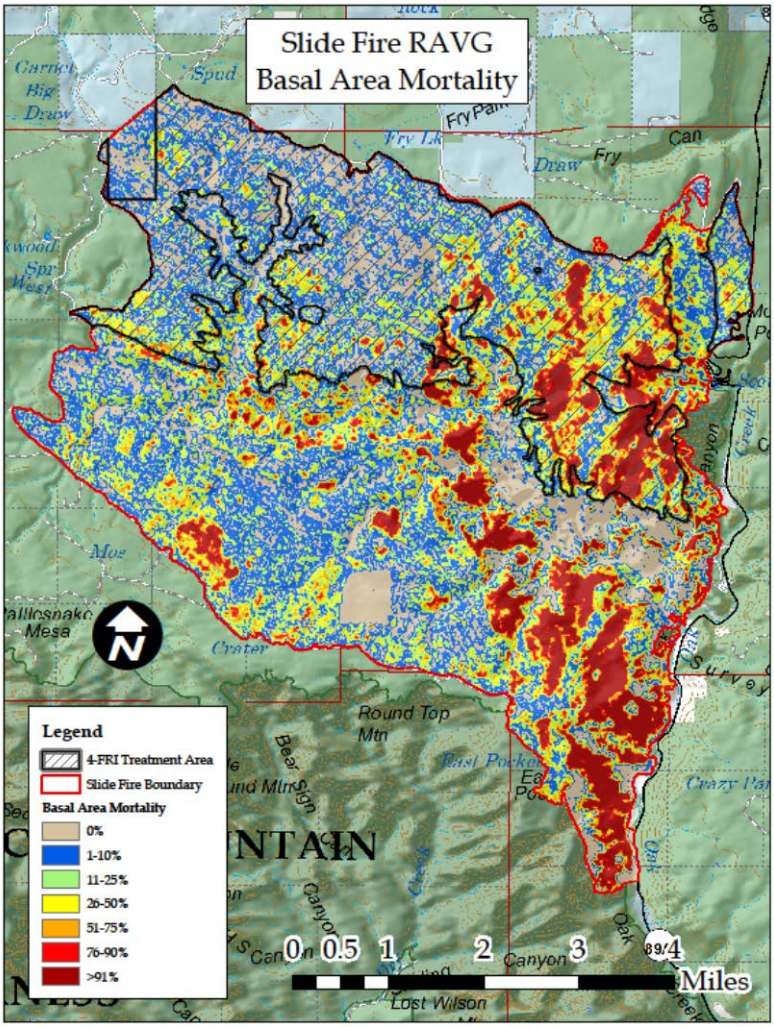

Figure 1. Basal area mortality from Slide Fire within 4FRI boundary.

Purpose and Need for Action

The purpose and need for proposing an action was determined by comparing the objectives and desired conditions in the Coconino NF and Kaibab NF Land Resource and Management Plans (forest plans) to the existing conditions related to forest resiliency and forest function. Where plan information was dated or not explicit, local research and the best available science were utilized. The purpose and need also was developed using the landscape restoration criteria found in the Omnibus Public Land Management Act.

The purpose of the project is to re-establish and restore forest structure and pattern, forest health, and vegetation composition and diversity. There is a need to increase forest resiliency and sustainability, protect soil productivity, and improve soil and watershed function. Resiliency increases the ability of the ponderosa pine forest to survive natural disturbances such as fire,

insect and disease, fire, and climate change (FSM 2020.5). A key objective is to comply with Omnibus Public Land Management Act criteria for landscape-scale restoration and achieve community, wildlife and forest protection while retaining as many large trees (greater than 16-inch d.b.h.) as possible.

The project is expected to move almost 600,000 acres towards comprehensive, landscape-scale restoration with benefits that include improved forest function and health, vegetation biodiversity, wildlife habitat, soil productivity, watershed function, and reduced risk of severe fire effects.

Proposed Action

The Coconino and Kaibab NFs propose to conduct approximately 583,330 acres of restoration activities over approximately 10 years or until objectives are met. On average, 45,000 acres of vegetation would be mechanically treated annually. On average, 40,000 to 60,000 acres of prescribed fire would be implemented annually across the two national forests (within the treatment area). Up to two prescribed fires would be conducted on all acres proposed for treatment over the 10-year period. Restoration activities would:

- Mechanically cut trees on approximately 384,966 acres. This includes: (1) mechanically treating up to 16-inch d.b.h. within 18 MSO PACs and, (2) using low-severity prescribed fire within 70 MSO PACs (excluding core areas).
- Apply prescribed fire on approximately 384,966 acres where mechanical treatment occurs.
- Utilize prescribed fire only on approximately 198,364 acres.
- Construct approximately 520 miles of temporary roads for haul access and decommission when treatments are complete (no new permanent roads would be constructed).
- Reconstruct up to 40 miles of existing, open roads for resource and safety concerns (no new permanent roads would be constructed). Of these miles, approximately 30 miles would be improved to allow for haul (primarily widening corners to improve turn radiuses) and about 10 miles of road would be relocated out of stream bottoms. Relocated roads would include rehabilitation of the moved road segment.
- Decommission 726 miles of existing system and unauthorized roads on the Coconino NF.
- Decommission 134 miles of unauthorized roads on the Kaibab NF.
- Restore 74 springs and construct up to 4 miles of protective fencing.
- Restore 39 miles of ephemeral channels.
- Construct up to 82 miles of protective (aspen) fencing.
- Allocate/manage as old growth 40 percent of the ponderosa pine type and 77 percent of the pinyon-juniper woodland on the Coconino NF.
- Manage and develop uneven-aged stands with a representation of old growth components across most of the project area on the Kaibab NF.

No forest plan amendments would be needed on the Kaibab NF. The proposed actions are consistent with forest plan objectives, desired conditions, and standards and guidelines. Three nonsignificant forest plan amendments (see FEIS appendix B) would be required on the Coconino NF to implement alternative B:

Amendment 1 would add language to allow mechanical treatments up to 16 inches d.b.h. to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre and post treatment, population, and habitat monitoring). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project. The amendment, which is specific to restricted habitat in pine-oak, would add definitions of target and threshold habitat.

Amendment 2 would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,952 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.

Amendment 3 would remove the cultural resource standard that requires achieving a “no effect” determination and would add the words “or no adverse effect” to the remaining standard. In effect, management would strive to achieve a “no effect” or “no adverse effect” determination

Figure 2 shows the extent of the proposed 4FRI project. Figure 3 shows the restoration units within the project area.

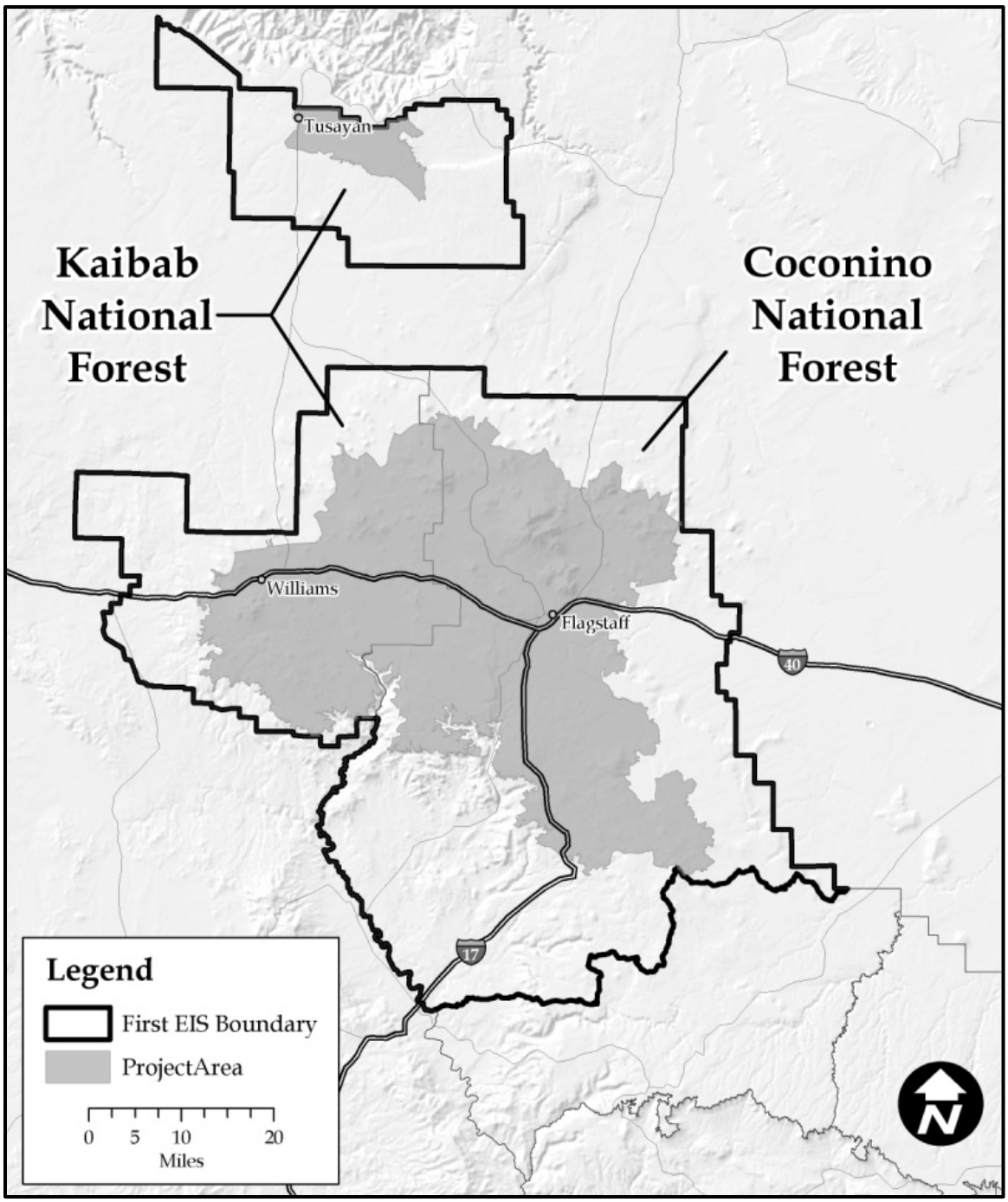

Figure 2 Proposed 4FRI project area.

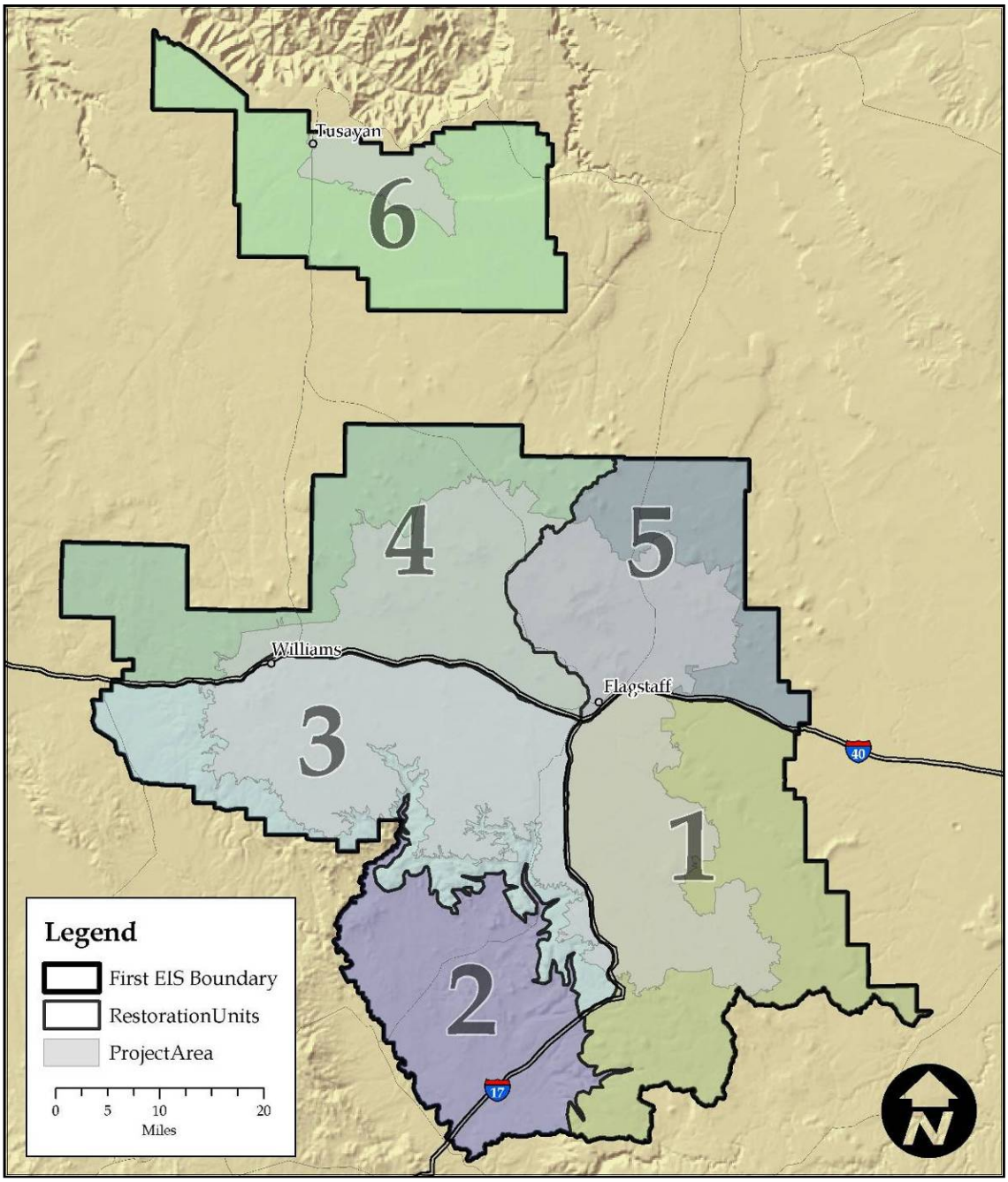

Figure 3 4FRI EIS boundary and restoration units.

Project Description

This report documents the analysis of effects of proposed 4FRI restoration treatments on recreation resources located in the area. The Forest Service developed five alternatives considered in detail, including No Action (alternative A), the proposed action (alternative B), the preferred alternative C, and two additional alternatives (alternatives D and E) that respond to recommendations and issues raised by the public. See the Final Environmental Impact Statement

for Four-Forest Restoration Initiative for detailed descriptions of the alternatives. The following descriptions include the proposed restoration activities, these do not include details of forest plan amendments, see the FEIS for these.

Alternative A – No Action

Alternative A is the no action alternative as required by 40 CFR 1502.14(c). There would be no changes in current management and the forest plans would continue to be implemented. Those forest plan actions and allocations are incorporated by reference. Approximately 166,897 acres of current and ongoing vegetation treatments and 195,076 acres of prescribed fire projects would continue to be implemented within and adjacent to the project area. Approximately 43,041 acres of vegetation treatments and 58,714 acres of prescribed fire and maintenance burning would be implemented within and adjacent to the project area by the Forests in the foreseeable future (within 5 years). Alternative A is the point of reference for assessing action alternatives B through E.

Items Common to All Action Alternatives

- All action alternatives (B–E) propose additional actions including restoring springs and ephemeral channels, constructing protective fencing in select aspen stands, constructing (and decommissioning) temporary roads, reconstructing and improving roads, relocating a minimal number of road miles, and decommissioning existing roads and unauthorized routes (table 1).
- On those acres proposed for prescribed fire, two fires would be conducted over the 10-year period.
- Design features, best management practices (BMPs), and mitigation to be used as part of alternatives B–E are located in volume 1, appendix C.
- All action alternatives incorporate key components of the Old Tree Protection Strategy into the alternative's design features (volume 1, appendix C), implementation plan (volume 1, appendix D), and the adaptive management, biophysical and socioeconomic monitoring plan (volume 1, appendix E). The Forest Service worked collaboratively with stakeholders to develop the final monitoring and adaptive management and implementation plan.
- All action alternatives include adaptive management actions that would be taken as needed to restore springs, ephemeral channels, and naturalize decommissioned and unauthorized roads (table 22).

Alternative B – Proposed Action

The Coconino and Kaibab NFs propose to conduct approximately 583,330 acres of restoration activities over approximately 10 years or until objectives are met. On average, 45,000 acres of vegetation would be mechanically treated annually. On average, 40,000 to 60,000 acres of prescribed fire would be implemented annually across the Forests (within the treatment area). Up to two prescribed fires would be conducted on all acres proposed for treatment over the 10-year period. Restoration actions would:

- Mechanically cut trees on approximately 384,966 acres. This includes mechanically treating up to 16-inch d.b.h. within 18 MSO PACs.
- Apply prescribed fire on approximately 384,966 acres where mechanical treatment occurs and use low severity prescribed fire within 70 MSO PACs (excluding core areas).
- Utilize prescribed fire only on approximately 198,364 acres.
- Construct approximately 520 miles of temporary roads for haul access and decommission when treatments are complete (no new permanent roads would be constructed).
- Reconstruct up to 40 miles of existing, open roads for resource and safety concerns (no new permanent roads would be constructed). Of these miles, approximately 30 miles would be improved to allow for haul (primarily widening corners to improve turn radiuses) and about 10 miles of road would be relocated out of stream bottoms. Relocated roads would include rehabilitation of the moved road segment.
- Decommission 726 miles of existing system and unauthorized roads on the Coconino NF.
- Decommission 134 miles of unauthorized roads on the Kaibab NF.
- Restore 74 springs and construct up to 4 miles of protective fencing.
- Restore 39 miles of ephemeral channels.
- Construct up to 82 miles of protective (aspen) fencing.
- Allocate/manage as old growth 40 percent of the ponderosa pine type and 77 percent of the pinyon-juniper woodland on the Coconino NF.
- Manage and develop uneven-aged stands with a representation of old growth components across most of the project area on the Kaibab NF

No forest plan amendments would be needed on the Kaibab NF. The proposed actions are consistent with forest plan objectives, desired conditions, and standards and guidelines (see forest plan consistency section). Three nonsignificant forest plan amendments (see FEIS appendix B) would be required on the Coconino NF to implement alternative B:

Amendment 1 would add language to allow mechanical treatments up to 16-inch d.b.h. to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre and post treatment, population, and habitat monitoring). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project. The amendment, which is specific to restricted habitat in pine-oak, would add definitions of target and threshold habitat.

Amendment 2 would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,952 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.

Amendment 3 would remove the cultural resource standard that requires achieving a “no effect” determination and would add the words “or no adverse effect” to the remaining standard. In effect, management would strive to achieve a “no effect” or “no adverse effect” determination.

Alternative C Preferred Alternative

The Coconino and Kaibab NFs would conduct restoration activities on approximately 586,110 acres over a period of 10 years or until objectives are met. On average, 45,000 acres of vegetation would be mechanically treated annually. On average, 40,000 to 60,000 acres of prescribed fire would be implemented annually across the Forests (within the treatment area). Up to two prescribed fires would be conducted on all acres proposed for treatment over the 10-year period. Restoration activities would:

- Mechanically cut trees on approximately 431,049 acres. This includes: (1) mechanically treating up to 17.9-inch d.b.h. within 18 Mexican spotted owl protected activity centers.
- Apply prescribed fire on approximately 431,049 acres where mechanical treatment occurs; this includes using low-severity prescribed fire within 70 Mexican spotted owl protected activity areas (including 54 core areas).
- Utilize prescribed fire only on approximately 155,061 acres.
- Construct approximately 520 miles of temporary roads for haul access and decommission when treatments are complete (no new permanent roads would be constructed).
- Reconstruct up to 40 miles of existing, open roads for resource and safety concerns (no new permanent roads would be constructed). Of these miles, approximately 30 miles would be improved to allow for haul (primarily widening corners to improve turn radiuses) and about 10 miles of road would be relocated out of stream bottoms. Relocated roads would include rehabilitation of the moved road segment.
- Decommission 726 miles of existing system and unauthorized roads on the Coconino NF.
- Decommission 134 miles of unauthorized roads on the Kaibab NF.
- Restore 74 springs and construct up to 4 miles of protective fencing.
- Restore 39 miles of ephemeral channels.
- Construct up to 82 miles of protective (aspen) fencing.
- Construct up to 12 flumes and 12 weather stations and associated instrumentation (up to 3 total acres of soil disturbance) to support the paired watershed study.
- Allocate/manage as old growth 40 percent of the ponderosa pine type and 77 percent of the pinyon-juniper woodland on the Coconino NF.
- Manage and develop uneven-aged stands with a representation of old growth components across most of the project area on the Kaibab NF

No forest plan amendments would be needed on the Kaibab NF. The proposed actions are consistent with forest plan objectives, desired conditions, and standards and guidelines. Three nonsignificant forest plan amendments (see FEIS appendix B) would be required on the Coconino NF to implement alternative C:

Amendment 1 would allow mechanical treatments up to 17.9-inch d.b.h. to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs. These PACs would be managed for a minimum basal area of 110. It would allow low-intensity prescribed fire within 54 MSO PAC core areas. The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre- and post-treatment, population, and habitat). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project.

The amendment, which is specific to restricted habitat in pine-oak, would add definitions of target and threshold habitat. It would allow 6,299 acres of restricted target and threshold habitat to be managed for a minimum range of 110 to 150 basal area.

Amendment 2 would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,653 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.

An exception to this amendment applies to about 38,256 acres of goshawk habitat. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6.

Amendment 3 would remove the cultural resource standard that requires achieving a "no effect" determination and would add the words "or no adverse effect" to the remaining standard. In effect, management would strive to achieve a "no effect" or "no adverse effect" determination.

Alternative D

Alternative D responds to Issue 2 (prescribed fire emissions) by decreasing prescribed fire acres by 69 percent (when compared to alternative B, proposed action). This equates to removing fire on about 404, 889 acres. A select number of MSO PACs would be mechanically treated but would not be treated with prescribed fire. All other components of the alternative are the same as described in alternative B.

The Coconino and Kaibab NFs would conduct restoration activities on approximately 563,407 acres over a period of 10 years or until objectives are met. On average, 45,000 acres of vegetation would be mechanically treated annually. On average, 40,000 acres of prescribed fire would be implemented annually across the Forests (within the treatment area). Two prescribed fires would occur over the 10-year treatment period. Restoration activities would:

- Mechanically cut trees on approximately 384,966 acres. This includes: (1) mechanically treating up to 16-inch d.b.h. within 18 MSO PACs, and, (2) disposing of slash through various methods including chipping, shredding, mastication, and removal of biomass off-site
- Utilize prescribed fire only on approximately 178,441 acres.
- Construct 520 miles of temporary roads for haul access and decommission when treatments are complete (no new permanent roads would be constructed).
- Reconstruct up to 40 miles of existing, open roads for resource and safety concerns (no new permanent roads would be constructed). Of these miles, approximately 30 miles would be improved to allow for haul (primarily widening corners to improve turn radiuses) and about 10 miles of road would be relocated out of stream bottoms. Relocated roads would include rehabilitation of the moved road segment.
- Decommission 726 miles of existing system and unauthorized roads on the Coconino NF.
- Decommission 134 miles of unauthorized roads on the Kaibab NF.
- Restore 74 springs and construct up to 4 miles of protective fencing.

- Restore 39 miles of ephemeral channels.
- Construct up to 82 miles of protective (aspen) fencing.
- Allocate/manage as old growth 40 percent of the ponderosa pine type and 77 percent of the pinyon-juniper woodland on the Coconino NF.
- Manage and develop uneven-aged stands with a representation of old growth components across most of the project area on the Kaibab NF

No forest plan amendments would be needed on the Kaibab NF. The proposed actions are consistent with forest plan objectives, desired conditions, and standards and guidelines. Three nonsignificant forest plan amendments (see FEIS appendix B) would be required on the Coconino NF to implement alternative D:

Amendment 1 would add language to allow mechanical treatments up to 16-inch d.b.h. to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs. These PACs would be managed for a minimum basal area of 110. The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre- and post-treatment, population, and habitat). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project.

The amendment, which is specific to restricted habitat in pine-oak, would add definitions of target and threshold habitat.

Amendment 2 would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,952 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.

Amendment 3 would remove the cultural resource standard that requires achieving a “no effect” determination and would add the words “or no adverse effect” to the remaining standard. In effect, management would strive to achieve a “no effect” or “no adverse effect” determination.

Alternative E

In alternative E eighteen MSO PACs would be mechanically treated to 9-inch d.b.h. No prescribed fire would be utilized within MSO PAC core areas. No acres would be managed for an open reference condition . No treatments would occur within the Garland Prairie management area. MSO population and habitat monitoring would follow current forest plan direction and the FWS biological opinion. The paired watershed study and small mammal research would occur. Key components of the stakeholder-created large tree retention strategy are incorporated into the alternative’s implementation plan.

The Coconino and Kaibab NFs would conduct restoration activities on approximately 581,020 acres over a period of 10 years or until objectives are met. On average, 45,000 acres of vegetation would be mechanically treated annually. On average, 40,000 acres of prescribed fire would be implemented annually across the Forests (within the treatment area). Two prescribed fires would occur over the 10-year treatment period.

Restoration activities would:

- Mechanically cut trees on approximately 403,218 acres. This includes: (1) mechanically treating up to 9-inch d.b.h. within 18 MSO PACs, and, (2) disposing of slash through various methods including chipping, shredding, mastication, and removal of biomass off-site.
- Apply prescribed fire on approximately 403,218 acres where mechanical treatment occurs.
- Utilize prescribed fire only on approximately 177,801 acres.
- Construct 520 miles of temporary roads for haul access and decommission when treatments are complete (no new permanent roads would be constructed).
- Reconstruct up to 40 miles of existing, open roads for resource and safety concerns (no new permanent roads would be constructed). Of these miles, approximately 30 miles would be improved to allow for haul (primarily widening corners to improve turn radiuses) and about 10 miles of road would be relocated out of stream bottoms. Relocated roads would include rehabilitation of the moved road segment.
- Decommission 726 miles of existing system and unauthorized roads on the Coconino NF.
- Decommission 134 miles of unauthorized roads on the Kaibab NF.
- Restore 74 springs and construct up to 4 miles of protective fencing.
- Restore 39 miles of ephemeral channels.
- Construct up to 82 miles of protective (aspen) fencing.
- Construct up to 12 flumes and 12 weather stations and associated instrumentation (up to 3 total acres of soil disturbance) to support the paired watershed study.
- Allocate/manage as old growth 40 percent of the ponderosa pine type and 77 percent of the pinyon-juniper woodland on the Coconino NF.
- Manage and develop uneven-aged stands with a representation of old growth components across most of the project area on the Kaibab NF.

Note: Measuring canopy cover at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6 represents no change to the current Coconino NF forest plan.

Design Criteria/Mitigation Measures

Design criteria for each resource were developed to eliminate or reduce adverse effects of the proposed actions on sensitive resources in Alternatives B-E. These design criteria include features required in order to comply with the Coconino and Kaibab forest plans and the MSO Recovery Plan (as appropriate). Site specific conditions may result in some variation in application of the design criteria. However, the overall effects of all actions must remain within maximum effects predicted in the environmental impact statement (EIS) and must comply with forest plan requirements. In addition to these design criteria, Best Management Practices from the Soil and Water Conservation Handbook (2509.22) apply.

The considerations and measures indicated in this document are focused on addressing two areas: 1) Rural-Roaded Natural-Roaded Modified Recreation Opportunity Spectrum (ROS) classes and associated Scenic Integrity Objectives (SIO), and 2) Semi-Primitive Motorized and Semi-Primitive Non-motorized ROS and SIO. If special considerations need to be made for the ROS class or SIO, they will be specifically called out; otherwise the measures apply to all situations. Since no treatments are proposed in Designated Wilderness, no mitigation measures were

developed for Primitive (often associated with Wilderness or special areas) or Semi-Primitive Non-Motorized Wilderness.

Mitigations have been combined to consider both ROS and SIO, based on the assumption that the Forest Service is interested in providing high quality recreation settings, experiences and benefits for their constituents (Forest Service 2000). Aesthetic value is an important consideration when managing recreation settings. The systems are complimentary as they analyze the landscape character of recreation settings, evidence of un-natural disturbances, and evidence of humans.

Vegetation and Fire Activities:

1. Edges of Individual Units
    a. Edges of treatment units will be shaped and/or feathered (create gentle transitions from more to fewer trees or fewer to more trees) to avoid abrupt changes between treated and untreated areas.
    b. Where the treatment unit is adjacent to denser forest (treated or untreated), the percent of thinning within the transition zone (150-250 feet) will be progressively reduced toward the denser edges of the unit.
    c. Similarly, where the treatment unit interfaces with an opening (including savannah and grassland treatments, and natural openings) the transition zone will progressively increase toward the open edges of the unit.
    d. Soften edges by thinning adjacent to the existing unit boundaries. Treat up to the edges; do not leave a screen of trees. Favor groups of trees complying with the prescribed treatment that visually connect with the unit's edge to avoid an abrupt and noticeable change.
    e. Treatment boundaries should extend up and over ridgelines to avoid the "Mohawk" look.
    f. Avoid widely spaced individual trees that are silhouetted along the skylines.
2. Unit Marking
    a. Avoid using trails as boundaries especially for different prescribed treatments.
    b. Avoid abrupt changes between treatment units. Use the techniques suggested for edges of treatment units (above).
    c. Where feasible strive to have the minimal marking of trees within the Arizona Trail corridor.
3. Road, Skid Trail and Landing Construction
    a. Utilize dust abatement methods during haul of logs on the following roads during the season when dust is likely and funding is available. Coordinate with Coconino County on the application and timing of application of dust abatement on road segments that have County Maintenance responsibilities.

Road Number	Beginning Milepost	Ending Milepost	Segment Length
556	0.734	1.245	0.511
418	0.004	1.004	1

418	1.697	2.372	0.675
0716B	0	0.76	0.76
140	5.657	6.158	0.501
141	3.134	3.431	0.297
141	14.303	14.963	0.66
141	31.487	33.968	2.481

b. Where new temporary roads and skid trails meet a primary travel route, they should intersect at a right angle, then curve after the junction, to minimize the length of route seem from the primary travel route.

c. Log landings, temporary roads, and skid trails should be minimized within sensitive viewsheds such as those next to developed recreation sites, private homes or communities, paved and passenger car level roads and trails.

d. Highest emphasis for log landing, skid trail and temporary road rehabilitation will be placed on foreground (up to 300 feet) of developed recreation sites, private homes or communities, and concern level 1 roads (paved roads and passenger car level roads) and trails, especially those designated as national scenic, historic or recreation trails.

e. Log landings, skid trails and temporary roads will be rehabilitated including restoring proper drainage, and reseeding as needed with native species.

f. To hasten recovery and help eliminate unauthorized motorized and non-motorized use of skid trails and temporary roads, use physical measures such as re-contouring, pulling slash and rocks across the line, placing cull logs perpendicular to the route, and disguising entrances.

g. Avoid using FS designated trails as skid trails or for temporary roads.

h. National Scenic, Historic, and Recreation Trails as well as forest system trails (motorized and non-motorized) will not be used for temporary roads or skid trails. It is acceptable to make perpendicular trail crossings. The locations of crossings will be designated. Trail crossings will be restored to pre-project condition after use.

i. Crossing of the Arizona Trail will be done sparingly and only if no other alternative exists. These crossing locations will be coordinated with District Recreation Staff.

j. Large, upright trail cairns used on Beale Wagon Road and Overland Trail must be protected. Locate cairns ahead of time. Logging operations will not damage the cairns.

4. Cull Logs, Stump Heights, and Slash Treatments

a. Cull logs will not be abandoned on landings.

b. Use cull logs for closing temporary roads and decommissioning roads.

c. Cull logs may also be suitable to use as down woody material, but must be scattered away from the landings.

d. Stump heights should be cut as low as possible, with a maximum height of 12 inches.

    i) In the foreground of paved and passenger car level roads, trails, recreation sites, private homes/communities, strive to make stump heights 6” or lower, with 12 inches as the exception, and rarely occurring.

e. Slash must be treated or removed.

f. In the seen area immediate foreground of sensitive places (within 300 feet of the centerline of paved or passenger car level roads or trails, or 300’ from the boundary of a recreation site or private land/communities):

    i) Where whole tree logging occurs, machine piling may occur to the back of log landings. Prioritize slash burning in these locations within one year or as soon as possible after treatment.

    ii) If conventional logging is used and trees are de-limbed and topped in the forest, machine piled slash should be placed at least 300 feet away from the centerline of roads and trails, developed recreation sites or private land/communities. In these instances piles should be burned as soon as possible or within three years.

g. Root wads and other debris in sensitive foreground areas will be removed, buried, burned, or chipped. If materials are buried, locate in previously disturbed areas where possible. Beyond sensitive immediate foreground areas, it is acceptable to scatter these or use them to help close temporary roads or skid trails.

h. If slash is not removed in grassland treatment areas, it is acceptable to create machine piles 300 feet away from the centerline of sensitive roads and trails, developed recreation sites and private land/communities.

i. Place project-generated slash outside of permitted utility line and pipeline rights-of-way; do not interfere with utility corridor management.

5. Fire Control Lines

    a. Generally restore control lines to a near undisturbed condition in the foregrounds (within 300 feet) of sensitive roads, trails, and developed recreation sites.

    b. To hasten recovery and help eliminate unauthorized motorized and non-motorized use of control lines in these areas, use measures such as recontouring, pulling slash and rocks across the line, and disguising entrances.

    c. Do not use motorized equipment on National Scenic, Historic and Recreation Trails, or other forest system trails if these are used for control lines. Coordinate with the District Recreation Staff regarding use of National Trails as control lines.

6. Coordinate with landscape architect prior to implementing jack straw treatments to protect aspen regeneration.

    a. Do not implement jack straw treatments within 1000 feet of the Arizona Trail.

7. Recreation and Other Trail Mitigation

    a. Recreation Sites

        i) Proposed mechanical treatments and prescribed fire adjacent developed recreation sites must be reviewed and approved by the District Ranger. Treatments may occur within Ten-X, Kaibab Lake and White Horse Lake Campgrounds. Work with the District Recreation Staff to determine boundaries or no treatment zones around constructed features that need to be protected in the campgrounds. Treatments around the perimeter of the campgrounds are encouraged. The timing of treatments must be worked out with Districts. Treatment will generally occur in fall, winter or spring. Activity slash must be piled in agreed upon locations, and treated as soon as possible. If campgrounds remain open into fall and winter, provide information about upcoming closures and management activities on site, at FS offices and FS websites.

        ii) Thinning and burning is appropriate at Garland Prairie Vista and Oakhill Snowplay Area, but constructed features must be protected from damage. Work with the District Recreation Staff to establish boundaries to protect constructed features.

    b. Provide public notice and information about treatment locations, timing and the type of treatment occurring prior to and during vegetation and fire treatments.

        i) Consider use of a hotline or link on our web pages that will indicate closures or hazards that may be encountered also use media and make sure front liners are well informed about activities occurring on the Districts and Forests.

    c. Place warning signs on all trail access points and along trails where treatment activities are occurring. It is also appropriate to place warning signs at developed recreation sites to inform visitors

    d. When mechanical treatment and burning are occurring along open trails, slash will be pulled back immediately within 100 feet of the centerline of the trail corridor.

    e. If trails are temporarily closed due to harvesting, the trail tread will be cleared of all slash.

    f. Character trees that have unique shape or form should be retained where feasible and should conform to the applicable prescription. Avoid lines of trees; strive to achieve a groupy appearance to avoid abrupt changes in the landscape character along the trail corridor.

    g. Work with District Recreation specialists to ensure well marked and publicized detour routes for the Arizona Trail during operational closures within the project.

    h. Implement road closures, one-way traffic, and area closure restrictions as deemed necessary by forest officials for health and safety concerns during any operation.

    i. Prohibit treatment activities in specifically designated units and the Forest system roads associated with these units during times of highest recreation use. The

highest recreation use and associated traffic occurs during the weeks of Federal observed Memorial Day, July 4th, and Labor Day.

8. In Semi-primitive Non-Motorized ROS classes specifically (occurring on about 7% of the approximately 598,764 acres):
    a. Temporary roads should not generally be built. If they are used, they will be restored to original conditions when projects are completed.
    b. Strive to make stump heights 6” or lower, with 12 inches as the exception, and rarely occurring.
    c. Slash must be treated or removed in these areas.
    d. Use existing barriers (roads) and natural barriers as control lines whenever possible.

Analysis Questions to be answered.

Analysis questions identify and address effects to all issues relating to recreation identified as needing analysis and disclosure, required analyses (such as TES, MIS) and effects relating to public concerns identified during scoping.

The following analysis questions respond to forest plan direction:

- Will project activities affect provision of a variety of recreation opportunities? *(Measure: acres of opportunities provided)*
- Will project activities result in substantial interference with the nature and purposes of the Arizona National Scenic Trail or adverse impacts to the Trail corridor? *(Measure: describe treatments and their effects)*
- Will smoke from pile burning and prescribed burning affect provision of recreation opportunities? *(Measure: describe and compare potential effects)*
- Will the proposed restoration activities diverge from reference conditions identified for the forest and in the mapped Recreation Opportunity Spectrum settings? *(Measure: acres meeting ROS settings)*
- Will proposed temporary road construction or other management activities result in inconsistencies in the designated ROS classes in the project area? *(Measure: miles of roads or acres of treatment in ROS classes impacted by roads in the project area)*

Analysis Process

The recreation analysis used demographic information generated from the “Economic Profile System-Human Dimensions Toolkit” (Headwaters Economics 2012 and 2012a) to identify changes in population growth and information about counties with public lands. Trends in recreation activities and participation were gathered from Forest Service research sources National Visitor Use Monitoring and the National Recreation Use Survey (Forest Service 2012a, 2012b, 2012c, 2012d; Cordell et al 2009) as well as the Arizona Strategic Outdoor Recreation Plan (Arizona State Parks 2008). The Recreation Opportunity Spectrum (ROS) mapping in the revised forest management plan (Kaibab NF) and updated ROS mapping (Coconino NF) and proposed management actions will be evaluated. Management guidance in The ROS Book (1976)

and ROS User Guide (1986), as well as Kaibab NF ROS-SMS Guidebook (USDA Forest Service 2004) will be used as reference for application of the ROS maps.

Special areas such as Designated Wilderness and Roadless Areas may be included within the project boundary, but no treatments are proposed for these areas. National scenic, historic, and recreation trails are included in the project area. Specific mitigations have been developed for nationally designated trails. There are treatments proposed in developed recreation sites proposed at Ten-X Campground on Tusayan Ranger District, Kaibab NF, Kaibab Lake and White Horse Lake Campgrounds, Oakhill Snowplay Area, and Garland Prairie Vista on Williams Ranger District, Kaibab NF. In addition, treatment may occur adjacent to or around these areas as well as around recreation sites on the Coconino NF.

Geographic Information System (GIS) information was used to create maps displaying location of existing recreation use on both forests, Travel Management decisions regarding dispersed camping, big game retrieval, fuelwood gathering, and analysis of forest plan ROS mapping and proposed treatments. In addition, field work and observed visitor activities from recreation program managers are incorporated to confirm GIS analysis, and to provide perspective on local forest activities.

Desired Conditions

Respond to the Forest Service's sustainable recreation strategy by implementing focus area "Restoration and Adaptation of Recreation Settings: Many of our recreation facilities and areas have deteriorated due to a lack of maintenance, high-volume visitor use, and natural processes such as fire and declining forest health**.** Others no longer fit the cultural values and use patterns of the populations they serve. This effort will restore and adapt settings and special places creating marked improvements in the condition of recreation sites and settings and a goal to eliminate the majority of deferred maintenance by 2019." (USDA 2010).

A spectrum of high-quality, sustainable outdoor recreation settings and opportunities will be available in the 4FRI Project area. Roaded Natural ROS areas will provide high scenic and recreational values and in Semi-Primitive settings will provide more natural appearing settings. The national forest system lands in the 4FRI area provide high quality recreation opportunities and settings that compliment and support local communities' tourism industries, and contribute to local residents' quality of life. Management activities on national forest system lands are consistent with recreation setting objectives that provide opportunities for the public to engage in a variety of developed and dispersed recreational activities, in concert with other resource management and protection needs.

Existing Conditions

The Coconino and Kaibab NF provide diverse outdoor recreation opportunities, connecting people with nature in a variety of settings. Forest users can hike, bike, drive motorized vehicles, camp, fish, view wildlife and scenery and explore historic and prehistoric places. They enjoy opportunities for year-round recreation activities from birding and wild flower observing in the spring, hiking in summer months, fall color viewing and hunting, to cross country skiing in the winter.

Recreation activities provide physical challenge, require development of skills and inspire wonder and curiosity about the natural world. Recreation contributes to the physical, mental and spiritual

health of individuals, families, and friends. Outdoor recreation has become a part of American culture (USDA 2010).

Forest users may occasionally experience short term or temporary disruptions in their recreation activities as a result of other groups currently occupying a preferred site, forest management activities such as current thinning or prescribed fire projects, fire restrictions or fire closures due to hot, dry weather and extreme fire danger, as well as natural occurrences such as fallen trees blocking a roadway or trail, and so on. When asked how visitors would react to such disruptions in their plans, they reported in the NVUM using substitution behaviors such as coming back another time, going elsewhere for a different activity, going elsewhere for the same activity, going to work, some other substitution or staying at home (USDA 2012).

U.S. voters indicate they are personally familiar with the nation's forests and value national forests for a variety of reasons including for their economic benefits (Fairbank 2011). Over 90% of voters value forests as sources of clean air and water, 86% for providing places for wildlife to live, 73% for providing a source of good-paying jobs, 73% for supplying essential products like wood and paper, 71% for providing a place for recreation and 60% for reducing global warming. 74% of voters indicate that they want to see efforts to protect and manage forests maintained or increased (Fairbank 2011).

Demographic shifts and lifestyle changes have affected the demand for recreation opportunities on national forests. Today about 80% of the population lives in urban settings and may not have the same values as rural residents who live closer to or may depend on natural resources for their livelihood (Forest Service 2010). In the West, growth of retirement communities and other population shifts have created urban settings close to public lands. Both of these trends have created challenges to Forest Service recreation managers to meet demands for an ever increasing number of recreation users as well as a diverse number of desired recreation activities.

Arizona has a high percentage of public land compared to private lands. Figure 4 displays land ownership for Arizona (USDA 2007). Private land is notably scarce in Arizona. Residents are more likely to rely on public land for recreation activities due to the lack of private facilities. In addition, public lands provide recreational, environmental and lifestyle amenities. Johnson and Stewart (2007) found that there is overlap between counties that contain national forests and those designated as recreational, high amenity, and retirement destinations. Increase in population density along the forest edge puts pressure on cultural and environmentally sensitive areas, increases the use of recreation facilities and complicates forest management and fire suppression. The researchers also found that counties with more than 10% of their land in national forests (almost 39% of Coconino County) grew by significantly larger margins than other counties (Headwaters Economics 2012).

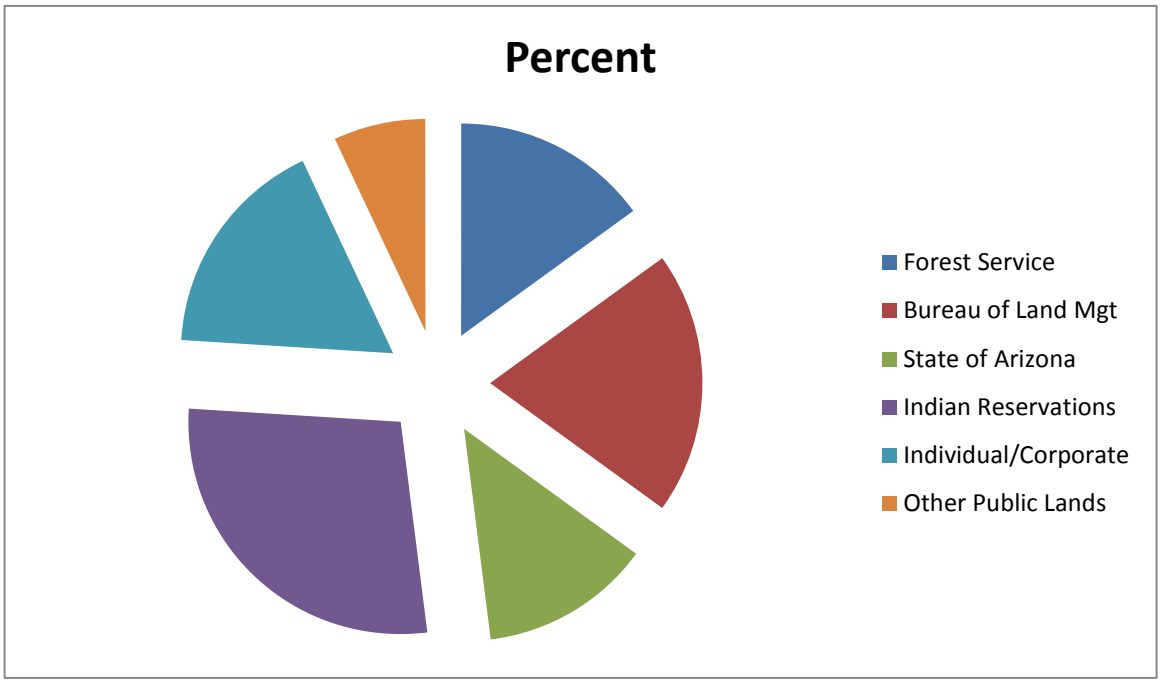

Figure 4 Land ownership in the State of Arizona (USDA 2007).

Population estimates from the 2010 Census for Arizona and Coconino County as compared to the United States show that population growth was greater in both locations than for the U.S. (see Table 3). Population growth is expected to continue into the future and will increasingly affect national forest management activities, as well as ability to provide satisfying recreation opportunities.

Arizona's population was one of the fastest growing in the United States from 2000 to 2010. It grew 24.6% during this time period (http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf). Following the overall economic decline in the last few years, this rate has declined to less than one percent per year. Recent evaluations indicate a slow recovery of Arizona's economy, and corresponding population growth (Vest 2012). As Arizona's population grows, demand for recreation grows (Arizona State Parks 2008). Rapid development and infill of limited private land also places more pressure on public land agencies to provide open space and recreation opportunities.

Table 3 Population growth in Coconino County, Arizona and the U.S. (Headwaters Economics 2012)

Population Change 2000-2010			
Year	**Coconino County**	**Arizona**	**U.S.**
2000	116,320	5,130,632	281,421,906
2010	131,824	6,246,816	303,965,272
Percent Change	21.8%	13.3%	8.0%

Public lands can play a key role in stimulating local employment by providing opportunities for

recreation. Communities adjacent to public lands can benefit economically from visitors who spend money in hotels, restaurants, ski resorts, gift shops, and elsewhere (Headwaters Economics 2012a). Table 4 displays the percent of local and State economies that provide recreation-related services. These help to indicate the travel and tourism related economic activities and trends in the 4FRI project area. At one-third of employment, travel and tourism related employment is a substantial part of Coconino County's employment.

Table 4 Employment in travel and tourism (Headwaters Economics 2012a)

Employment in Travel and Tourism (percent)			
Percent of Total	Coconino County	Arizona	United States
Total Travel & Tourism Related	33.3%	16.9%	14.9%
Retail Trade Segment	5.1%	2.9%	2.7%
Passenger Transportation Segment	0.6%	0.5%	0.4%
Arts, Entertainment & Recreation Segment	3.0%	2.1%	1.8%
Accommodation & Food Segment	24.6%	11.4%	10.0%
Total Non-Travel & Tourism	66.7%	83.1%	85.1%

Participation in recreation activities continues to increase across the country. In 2009 Cordell et al compiled recreation participation data in the US from the 1980's to 2000's. Table 5 displays this information and shows trends in the data over almost 20 years. Recreation activities that occur on National Forests were included in the table, activities such as "attend outdoor concerts and plans" were removed as not applicable to the analysis.

Table 5 Trends in U.S. participation in recreation activities (Cordell et al 2009).

Activity	1982-1983		1994-1995		1999-2001		2005-2009		Trend	
	Percent of population participating	Total participants (millons)	Percent of population participating	Total participiants (millons)	Percent of population participating	Total participiants (millons)	Percent of population participating	Total participiants (millons)	Percent Change in participants 1992-2009	Change in number of participants (millions 1982-2009
Walk for pleasure	53.0	91.9	68.8	138.5	82.4	176.4	84.1	194.2	111.3	102.3
View or photograph birds	12.0	20.8	27.0	54.3	31.8	68.0	34.9	80.5	287.0	59.7
Day hiking	14.0	24.3	26.6	53.6	32.4	69.3	32.6	75.3	209.9	51.0
Visit nature centers, etc.	50.0	86.7	55.1	110.9	56.7	121.3	55.1	127.2	46.7	40.5
Swimming in lakes, streams, etc.	32.0	55.5	43.4	87.4	41.4	88.6	40.7	94.0	69.4	38.5
Sightseeing	46.0	79.8	58.4	117.5	50.8	108.7	50.5	116.6	46.1	36.8
Bicycling	32.0	55.5	38.7	77.8	39.6	84.7	39.2	90.4	62.9	34.9
Running or jogging	26.0	45.1	28.2	56.7	32.9	70.5	34.5	79.6	76.5	34.5
Picnicking	48.0	83.3	55.7	112.1	54.9	117.5	50.9	117.5	41.1	32.5
Boating	28.0	48.6	37.8	76.2	36.3	77.6	35.6	82.1	68.9	33.5
Driving for pleasure	48.0	83.3			50.3	107.7	48.8	112.7	35.3	29.4
Drive off road	11.0	19.1	17.8	35.9	17.4	37.3	20.0	46.2	141.9	27.1
Develped camping	17.0	29.5	23.1	46.5	26.4	56.5	24.1	55.7	88.8	26.2

The Arizona SCORP (Arizona State Parks 2008) confirmed that most citizens live in urban areas and in addition, that cities are “park” poor. Most cities have not planned adequately for city or municipal parks. Since there are large quantities of federal land in Arizona, much of the desire for outdoor recreation opportunities is met by these areas.

In the SCORP survey questions regarding outdoor recreation issues, most Arizonans identified the desire to have open space near their home. There were equal numbers who felt that either there was adequate open space and natural areas or increasing population makes it more difficult to have adequate open space and natural areas. When asked to rank the benefits of outdoor recreation, most people indicated outdoor recreation improves their quality of life by promoting a healthy lifestyle, providing opportunities for family interactions, and making

cities and regions better places to live. The desire for outdoor recreation opportunities and the benefits of engaging in them seems to correlate with the research by Johnson and Stewart (2007) regarding the overlap between population growth and counties that contain national forests and those designated as recreational, high amenity, and retirement destinations. Table 6 displays a selection of outdoor recreation activities that are applicable to federal lands. In the survey, Arizonans ranked the number of times they participated in outdoor recreation

Table 6 Excerpt of Arizonan outdoor recreation participation and anticipated increases (Arizona State Parks 2008)

Recreation Category	Percent Participating	Mean Days/Visits per Year	Potential Increase*
Participate in an outdoor activity on your feet: hike, jog	74.7%	34.25	33.7%
Drive motorized vehicle for sightseeing, pleasure	83.7%	27.68	38.4%
Ride bike, mountain bike, horse	49.1%	22.9	34.1%
Visit a park, natural or cultural feature	85%	12.65	47.9%
Visit a wilderness or nature preserve	74.5%	12.25	47.4%
Picnicking	77.4%	9.49	40.6%
Off-road driving: ATV, dirt bike, 4-wheeling	33%	8.93	24.1%
Canoe, kayak, swim in a natural setting	45%	7.26	33.2%
Winter activities: skiing, sledding, snowplay	37.7%	3.15	31.3%
Tent camping	33.5%	3.05	32%
RV camping	24.3%	2.03	25.6%
Hunting	11.3%	1.67	10.9%
Extreme sport: BMX or snowboarding	8.3%	1.4	9.6%

opportunities as well as whether and how much they anticipated increasing their participation in these activities. For the purposes of this report, the mean number of visits was reported, as well as the percent increase. The full results of this survey question can be reviewed

at: http://azstateparks.com/publications/index.html.

In the full survey, several of the identified activities showed at least some level of participation by 75% of respondents including hiking, picnicking and driving for pleasure, and about half of Arizonans reported riding bikes. Inclusion of the anticipated increase in recreation participation helps recreation managers to anticipate potential increases in particular activities.

The SCORP also looks at outdoor recreation regionally. The 4FRI project area is within the Northern Arizona Council of Governments (NACOG) region that includes Coconino, Navajo, Apache and Yavapai Counties. In comparison with the Arizona State figures, more residents in the NACOG region participate in outdoor recreation activities more times throughout the year than in other regions of Arizona, as shown in Table 7. Although most people reported that they would increase their participation, it was generally not as much as reported state-wide. Differences between the regional and state-wide numbers may be partly explained by relative proximity to recreation opportunities. For example, the mountains in the Northern Arizona region make it easier for local residents to access and participate in winter activities.

Table 7 Excerpt of NACOG Region outdoor recreation participation and anticipated increase (Arizona State Parks 2008)

Recreation Category	Percent Participating	Mean Days/Visits per Year	Potential Increase*
Participate in an outdoor activity on your feet: hike, jog	85.2%	34.7	33.9%
Drive motorized vehicle for sightseeing, pleasure	89.4%	34.01	25.9%
Ride bike, mountain bike, horse	53.4%	18.28	33.9%
Visit a park, natural or cultural feature	88%	16.35	42.3%
Visit a wilderness or nature preserve	83.6%	20.92	42.3%
Picnicking	78.3%	10.47	34.6%
Off-road driving: ATV, dirt bike, 4-wheeling	47%	15.21	25.4%
Canoe, kayak, swim in a natural setting	56%	7.93	36%
Winter activities: skiing, sledding, snowplay	58.2%	9.54	33%
Tent camping	45%	6.62	36%
RV camping	23.8%	1.99	33.9%

Hunting	19.6%	3.23	23.8%
Extreme sport: BMX or snowboarding	8.3%	3.4	10.6%

*Self-report anticipated increase in participation.

Local recreation information is available for both the Coconino and Kaibab National Forests. Both forests have been surveyed several times in the National Visitor Use Monitoring Survey or NVUM). NVUM estimates the volume of recreation visitation to National Forests and Grasslands and produces descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit. Table 8 compares the most recent visitation on both forests from 2005 and 2010.

Table 8 Coconino and Kaibab visitation comparison by year, site type and forest.

Forest	**Site Type**					**Total**
	Day Use Developed	**Overnight Developed**	**Undeveloped Areas**	**Wilderness**	**Skiing**	**National Forest Visits**
Coconino 2005	2,308,000	148,000	2,700,000	384,000	138,000	3,275,000
Coconino 2010	2,244,000	128,000	1,842,000	501,000	130,000	2,868,000
Kaibab 2005	96,000	120,000	32,000	28,000	2,000	184,000
Kaibab 2010	274,000	403,000	70,000	9,000	2,000	456,000

Survey numbers indicate that the Coconino NF visitation decreased about 12 percent over the five year period. There were decreases in day use developed site use, overnight developed site use, undeveloped areas and skiing. The site type that had increased visitation was Wilderness use. On the Kaibab NF, visitation increased about 2.4 % over the five year period. All site types had increased use except for Wilderness and skiing.

According to NVUM, most visitors to the Coconino NF use day use developed sites (such as picnic areas, observation points, and trailheads) and undeveloped areas (the general forest area with no developed facilities). As noted above, there was also a jump in Wilderness use. On the Kaibab NF, the majority of visitors use overnight developed sites (campgrounds) and day use developed sites. In all of these sites visitors may engage in a number of different recreation activities (they are not limited to camping when staying at a campground). The types of activities that people participate in are displayed in the next two tables (9 and 10) displayed by forest. This is not a comprehensive list; instead, activities that could be affected by the proposed activities have been selected from the report. The entire list is available at http://apps.fs.usda.gov/nrm/nvum/results/

Table 9 Comparison of selected recreation activity participation in 2005 and 2010 for the Coconino National Forest (USDA Forest Service 2012 and 2012b).

Activity	Percent Participation 2005	Percent Participation 2010
Viewing Natural Features	84.2%	73.1%
Hiking/Walking	71.2%	70.8%
Viewing Wildlife	63.9%	48.7%
Relaxing	60.2%	62.3%
Driving for Pleasure	51.3%	46.1%
Visit Historic Sites	30.9%	29.2%
Nature Study	18.2%	17%
Picnicking	14.8%	21.4%
Fishing	5.8%	4.8%
Bicycling	5.7%	6.2%
OHV Use	5.6%	9%
Motorized Trail Activity	5.4%	3.8%
Developed Camping	4.4%	5.5%
Downhill Skiing	4.4%	5%
Primitive Camping	4.2%	4.2%
Motorized Water Activities	2.6%	1%
Hunting	2.1%	2.1%
Backpacking	1.7%	1.4%
Horseback Riding	0.9%	1.2%
Cross-country Skiing	0.2%	1.2%

The percent of participation in the activities varies by survey year, but the types of activities have not varied. The Coconino NF data shows a decrease in the amount of people viewing natural features, although over 70% of people still report engaging in this activity. Other changes are notable including the decrease in viewing wildlife, increase in picnicking and OHV use, decrease in motorized trail activities and decrease in motorized water activities.

Table 10 Comparison of recreation activity participation in 2005 and 2010 for the Kaibab National Forest (USDA-Forest Service 2012c and 2012d).

Selected Recreation Activity Participation on the Kaibab NF		
Activity	**Percent Participation 2005**	**Percent Participation 2010**
Viewing Natural Features	53.4%	55.4%
Hiking/Walking	48.7%	53.2%
Viewing Wildlife	45.2%	45.5%
Driving for Pleasure	43%	49.4%
Relaxing	38.4%	35.6%
Developed Camping	20.9%	16.8%
Visit Historic Sites	20.5%	17.4%
Picnicking	14.1%	14.6%
Nature Study	11.8%	9.9%
Primitive Camping	9.3%	9.2%
Resort Use	8.7%	19.4%
Bicycling	6.3%	4.2%
Motorized Trail Activity	5.5%	4.2%
Fishing	5.2%	16.3%
Hunting	2.9%	0.9%
Horseback Riding	2.2%	1.8%
Backpacking	2%	4.8%

Downhill Skiing	1.5%	0.5%
Motorized Water Activities	2%	0.7%
Cross-country Skiing	0.1%	0%

On the Kaibab NF, there were similar changes in the percent participation by activity type between the two survey years. Larger changes can be seen in the increased hiking/walking, driving for pleasure, resort use, fishing and backpacking. Decreases are seen in developed camping, visiting historic sites, hunting and downhill skiing.

People who participated in the NVUM came from Coconino County, Maricopa County, Arizona, nearby states and other countries. Table 11 compares Coconino and Kaibab NF figures regarding residence, and Table 12 presents a comparison of distance travelled on the day that they were interviewed on each forest. The Kaibab NF had twice as many visitors from Coconino County, AZ than the Coconino NF. About one-third of visitors to both forests came from Maricopa County (including the Phoenix metro area). Five to seven percent of visitors were international.

Table 11 Comparison of visitor origin for Coconino and Kaibab NF (USDA Forest Service 2012, 2012c)

Location	**Approximate Percent of Visitors to Coconino NF***	**Approximate Percent of Visitors to Kaibab NF***
Coconino County, AZ	12%	26%
Yavapai County, AZ	11%	7%
Maricopa County, AZ (Phoenix metro area)	32%	27%
Other AZ Counties	3%	3%
California	3%	7%
Utah	0.2%	2%
International	5%	7%

*All other states are less than 1%.

Table 12 Comparison of distance travelled for Coconino and Kaibab NF (USDA Forest Service 2012. 2012c)

Distance Travelled for Visit	Percent of Visitors to Coconino NF	Percent of Visitors to Kaibab NF
0-5 miles	64%	87%
6-25 miles	17%	8%
26-50 miles	6%	3%
51-100 miles	5%	1%
101-200 miles	5%	0%
201-300 miles	2.2%	0.6%
301+ miles	1.7%	<0.1%

Ninety-five percent of visitors to the Kaibab NF came from the local area within 25 miles and only about five percent travelled over 25 miles to visit the forest. The Coconino NF had a similar trend, with 81 percent of visitors coming from within 25 miles of the forest, and about 16 percent visiting from over 25 miles away. This table may be misleading, since visitors were asked from where they traveled that day, and does not indicate where they reside (as noted in Table 11).

When visitors were asked about substitution behaviors for the trip that they were on, 54% of Coconino NF visitors reported they would have gone somewhere else to participate in the same activity, compared to only 36% of visitors to the Kaibab NF (USDA Forest Service 2012, 2012c). Similarly 16% of Coconino NF visitors reported they would come back another time compared to 32% of Kaibab NF visitors. About 56% of people would travel up to 100 miles to an alternate location from the Coconino NF and 44% of Coconino NF visitors would travel 100 to 300+ miles away. About 38% would travel 100 miles away and 61% would travel 100 to 300+ miles from the Kaibab NF. Tables 13 and 14 display these data sets for both forests.

Table 13 Substitution behaviors for forest visitors (USDA Forest Service 2012, 2012c)

Substitution Behavior	Percent Reporting Behavior for the Coconino NF	Percent Reporting Behavior for the Kaibab NF
Come back another time	16%	32%
Gone elsewhere for a different activity	11%	26%
Gone elsewhere for the same activity	54%	36%
Gone to work	1%	0.2%
Another substitution	8%	2%
Stay at home	10%	3%

Table 14 Distance visitor would travel to an alternative location (USDA Forest Service 2012, 2012c).

Distance	Percent for Coconino NF	Percent for Kaibab NF
0-25 miles away	30%	16%
26-50 miles away	11%	8%
51-75 miles away	3%	4%
76-100 miles away	12%	10%
101-200 miles away	16%	28%
201-300 miles away	6%	2%
300+ miles away	22%	31%

Visitor satisfaction was measured for both forests. The two indicators displayed relate to recreationist satisfaction with the condition of undeveloped or general forest areas (most similar to condition of recreation settings in MVUM) are condition of scenery and condition of environment. For both forests, satisfaction with scenery was very high for over 90% of visitors. Satisfaction with the condition of the environment was very high for over 70% of visitors and high for over 18% of visitors. The details of these ratings are shown below in Table 15.

Table 15 Visitor satisfaction for both forests (USDA Forest Service 2012, 2012c)

Satisfaction Measure	Percent Ranking Coconino NF			Percent Ranking Kaibab NF	
	Very High	High	Neither High nor Low	Very High	High

Condition of Scenery	93%	5%	2%	98%	2%
Condition of Environment	77%	18%	5%	73%	27%

Recreation Opportunity Spectrum

Visitors choose specific settings for their activities in order to enjoy desired experiences (USDA Forest Service 1986, USDA Forest Service 1982, 1986). These settings vary by Geographic Area and are further refined by the Recreation Opportunity Spectrum (ROS). The Recreation Opportunity Spectrum is a classification system that describes different outdoor recreation settings across the Forest that range from primitive, undeveloped settings to urban, highly developed settings. Attributes typically considered in describing the settings are size, scenic quality, type and degree of access, remoteness, level of development, social encounters, and the amount of on-site management. By describing existing recreation opportunities in each class, ROS helps match visitors with their preferred recreation setting (USDA Forest Service 1982, 1986). Changes in a national forest's mix of ROS classes affect the recreation opportunities offered.

ROS characterizations that apply to this project are found below in Table 16 (Primitive, Semi-Primitive Non-Motorized Wilderness is not shown since designated Wilderness is not treated in this project).

The table describes the setting and experience characterizations in the handbook (Forest Service 1976, 1986). Note that the Kaibab NF includes expanded the ROS classes, adding two additional classes, Semi-Primitive Non-Motorized Wilderness and Roaded Modified, that the Coconino NF does not. As noted in the ROS Book (1986), the ROS system is flexible and can be expanded to include local conditions. Additions included in the Kaibab NF ROS-SMS Guidebook are shown in italicized text in the table. These apply to the Kaibab NF portions of the project area.

In addition to experience and setting characterizations, the scenic quality of ROS settings is considered. Scenic quality information is found in the Scenery section of the EIS as well as in the Scenery Specialist Report.

Table 16 ROS setting and experience characteristics (USDA Forest Service 1982, 1986) and Kaibab NF specific guidance (USDA Forest Service 2004).

ROS Class	Setting Characterization
Semi-Primitive Non-Motorized	CNF and KNF Setting: Area is characterized by a predominantly natural or natural appearing environment. Interaction between users is low, but there is often evidence of other users. The area is managed with minimum on-site controls and restrictions. Motorized use is not permitted. *Resource management subtle, may be restricted.* Experience: High probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility and self-reliance.
Semi-primitive Motorized	CNF and KNF Setting: Area is characterized by a predominantly natural or natural appearing environment. Concentration of users is low, but there is evidence of other users. Minimum on-site controls and restrictions may be present, but subtle.

	Motorized use is present. *KNF: Resource management subtle, may be restricted* Experience: Moderate probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility and self-reliance.
Roaded Natural	CNF and KNF Setting: Area is characterized by predominantly natural appearing environments with moderate evidences of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Motorized use is permitted. *KNF: Resource management protects or enhances recreational and scenic values. Mitigations may be required for vegetation treatments.* Experience: About equal probability to experience affiliation with other user groups and for isolation from sights and sounds of humans. Opportunity to have a high degree of interaction with natural environment.
Rural	CNF and KNF Setting: Area is characterized by a substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and maintain vegetative cover and soil. Sights and sounds of humans are readily evident and interaction between users is often moderate to high. Motorized use permitted. *KNF: Resource management protects or enhances recreational and scenic values. May require mitigations in sensitive areas* Experience: Probability for experience affiliation with individuals and groups is prevalent. These factors are more important than the setting of the physical environment.
Urban	CNF Setting: Area is characterized by substantially urbanized environment, although the background may have natural appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Sights and sounds of humans on site are predominant. Experience: Probability for experience affiliation with individuals and groups is prevalent. These factors are more important than the setting of the physical environment. Experiencing natural environment…relatively unimportant. *KNF: used only in Tusayan, AZ, not on national forest land.*
Roaded Modified	*KNF Setting: Areas are not managed for high recreation use or values. Other resource management needs will generally take priority over recreation values; however, some sensitive travel routes (roads and trails) within or adjacent to the area may require some consideration to maintain desired recreation values. Fire/fuels treatments are consistent.* *KNF Experience: About equal probability to experience affiliation with other user groups and for isolation from sights and sounds of humans. May include intensively managed wildland resource landscapes or utility corridors.*

Both forests have updated Recreation Opportunity Spectrum maps (Kaibab in 2004/2014, and Coconino in 2011) that represent the desired condition for ROS. Not all acres on the national forests currently meet these desired conditions. The percent of acres in each ROS class are shown in Table 17 and the combined project maps are found in Figure 5. Over 60% of the project is in the Roaded Natural ROS class, approximately 20% is in Semi-Primitive Motorized. The remaining classes (Semi-primitive non-motorized, Roaded Modified, Rural and Urban) make up less than ten percent of the 4FRI area.

Table 17 Acres in each ROS class for the approximately 598,784 acre 4FRI project area.

Recreation Opportunity Spectrum Class	Percent of Acres
Semi-primitive Non Motorized	7%
Semi-primitive Motorized	21%
Roaded Natural	61%
Roaded Modified	<1%
Rural	8%
Urban	2%

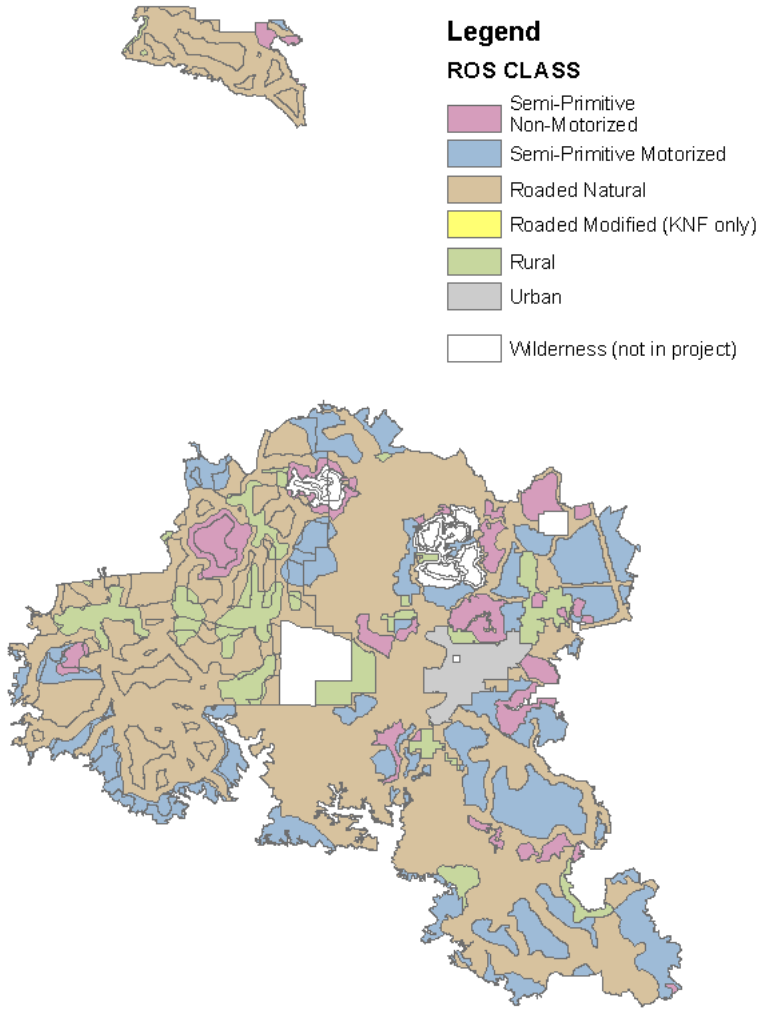

Figure 5 ROS class map for the 4FRI project area.

Throughout much of the project area, numerous resource management activities have occurred including vegetation management, road maintenance, developed recreation site construction, trail construction and maintenance, prescribed burning, hazard tree removal, utility corridor clearing and others. In addition, there have been numerous wildfires in the area. Not all projects have met or currently meet the characterizations and mapped ROS classes at this time.

Both national forests in the project area offer numerous developed recreation opportunities as illustrated in Figure 6. The 4FRI project does not include restoration activities in developed recreation sites, special areas, or designated Wilderness. Outside of these areas, many forest users engage in dispersed recreation including hiking, dispersed camping, driving motorized vehicles, rock climbing, cross country skiing, snow play and many other activities. There will be restoration activities in many places where dispersed recreation occurs.

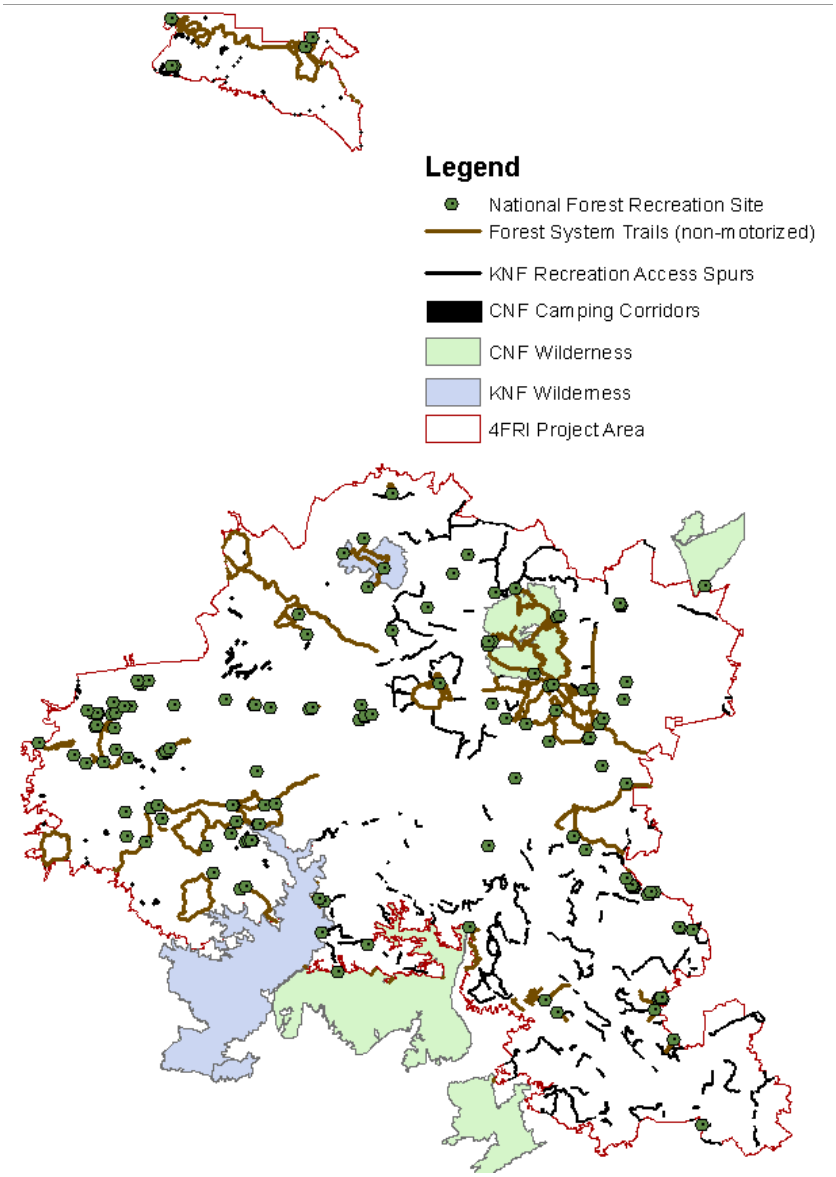

Figure 6 Developed recreation opportunities in 4FRI project area.

Arizona National Scenic Trail

The Arizona National Scenic Trail (Arizona Trail) was designated a National Scenic Trail by Congress in the Omnibus Public Land Management Act of 2009. It extends approximately 800 miles across the State of Arizona from the border with Mexico to the border with Utah. The ANST is intended to be a primitive, long distance trail that highlights the state's topographic, biologic, historic, and cultural diversity. Administration of the Arizona Trail is the responsibility of the Regional Forester. Figure 7 shows the trail alignment within the 4FRI project area.

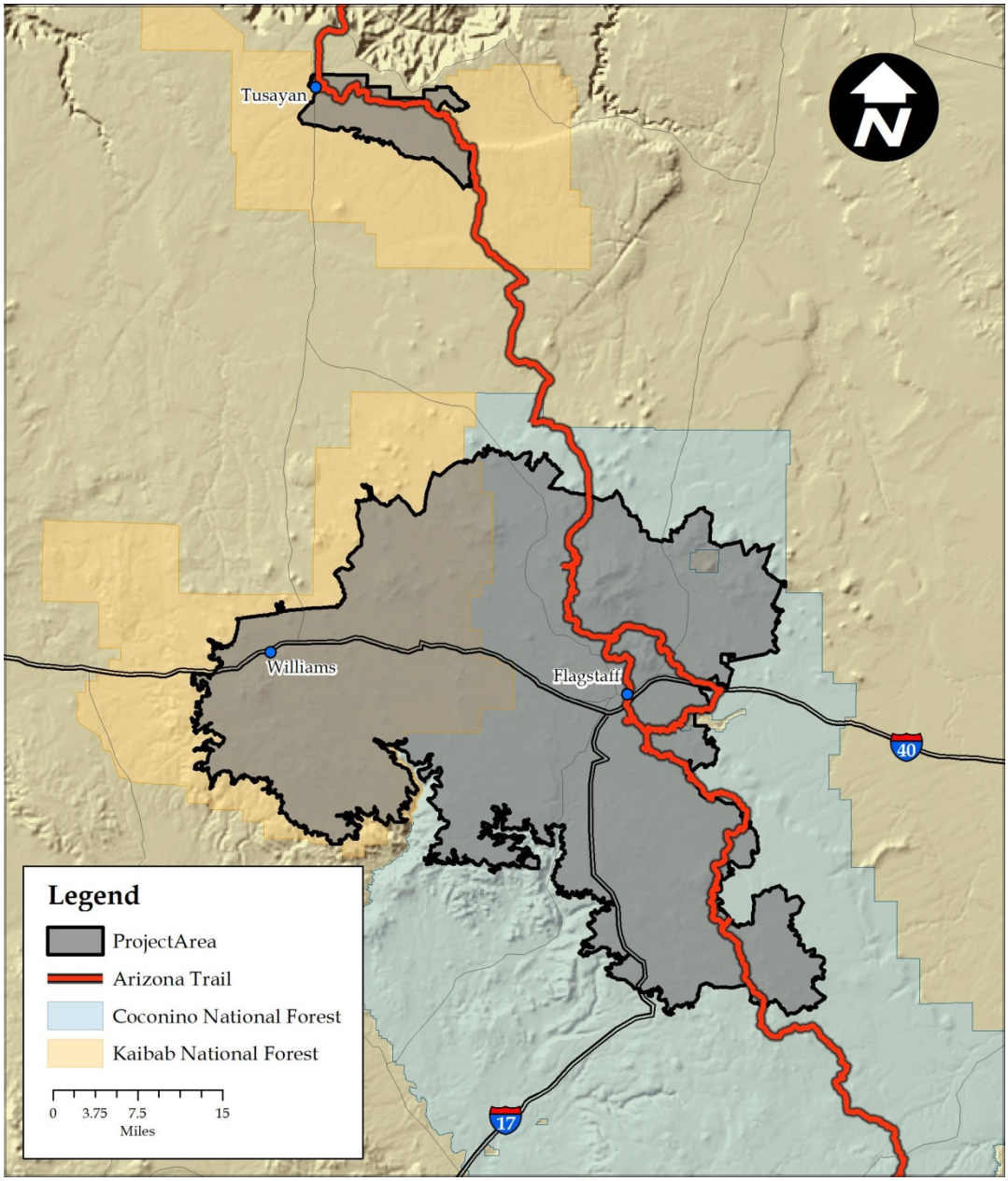

Figure 7. Arizona Trail route as it intersects with the 4FRI project area.

The Arizona Trail is Arizona's only National Scenic Trail and provides local hiking opportunities around the Flagstaff area, as well as a recreational experience to long distance hikers, mountain bikers and equestrians. The Arizona Trail corridor represents a connected landscape across the state. As the trail becomes a better known, people from the U.S and internationally are coming to experience a unique cross-section of Arizona that can only be seen by traveling the Arizona Trail.

As envisioned in "Trails for America" report (American Trails 2012) national scenic trails are to be very special trails: "According to the National Trails System Act (1968) national trails "will be extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of nationally significant scenic, historic, natural, and cultural qualities of the area through which such trails may pass" . National scenic trails may be located so as to represent desert, marsh, grassland, mountain, canyon, river, forest, and other areas, as well as landforms which exhibit significant characteristics of the physiographic regions of the Nation.

Per 16 USC 1246 Administration and Development of National Trails System, each federal agency is required to select the trail right of way and publish its location. Per Section 2, "Development and management of each segment of the National Trails System shall be designed to harmonize with and complement any established multiple-use plans for that specific area in order to insure continued maximum benefits from the land." Forest Service Manual 2353.41 also provides guidance "Develop and administer National Scenic and National Historic Trails to ensure protection of the purposes for which the trails were established and to maximize benefits from the land" and in 2353.42 "Administer National Scenic and National Historic Trail corridors to be compatible with the nature and purposes of the corresponding trail."

The existing Coconino NF Management Plan (2007) provides guidance that this is a non-motorized trail. The revised Draft Coconino NF Management Plans (2011) provides desired conditions for the trail including "*the Trail will emphasize a semi-primitive recreation experience in a predominantly natural or natural-appearing landscape. Where infrastructure and facilities impact the scenic integrity along the trail, mitigation is applied appropriately. Recreation does not negatively impact cultural and natural resources, or scenic integrity.*" The revised Kaibab NF Management Plan (2014) provides desired conditions for national trails, including "*Views in the immediate foreground (0 to 300 feet) of national scenic and recreation trails include natural-appearing landscapes. The landscapes have high scenic values and generally appear unaltered by human activities*" and specifically "*The Arizona National Scenic Trail provides both short and long-distance non-motorized recreation opportunities in mainly remote and primitive settings representative of the dramatic natural landscapes and varied vegetation of Arizona*". It also provides the guideline "*Projects should preserve the recreation opportunity setting for any affected segments*".

Travel Management

From 2010 through 2011, the Kaibab and Coconino NF completed travel management planning (referred to as TMR). The TMR project prohibits cross country travel and restricts public motorized travel on the forests except on designated roads, trails and areas as per the final TMR rule http://www.fs.fed.us/recreation/programs/ohv/final.pdf. It does allow for emergency activities, and limited administrative motorized use of non-designated forest roads, trails and areas. Travel management is regulated by each forest's motorized vehicle use maps (MVUM). These include information about authorized motorized activities including designated roads, trails

and areas, dispersed camping, motorized game retrieval and fuelwood gathering (USDA-Forest Service 2011a). Non-motorized recreation activities are not included in the travel management MVUM. The 4FRI project will adhere to the TMR decisions for the Kaibab and Coconino NF.

Effects Analysis

Alternative A - No Action

Under the No Action alternative, there would be no immediate direct, indirect, or cumulative effects on the existing recreational settings or facilities, or the Arizona National Scenic Trail. There would be no change in current rate of management actions, and there would be scattered treatments where the existing recreational settings could change in the short term (1-5 years) per Kaibab NF or Coconino NF forest plans, but would generally recover and meet the existing ROS settings in the long term. Although stand densities would remain unnaturally high in much of the project area, some visitors are not aware of the unnatural condition of the forest, and their experience and perception of forest conditions would not change.

Vegetation and fuels treatments would continue to be implemented in scattered locations across both forests. Per forest plan direction and Community Wildfire Protection Plans, wildland urban interface areas would be high priority places for treatment. Since many small communities and subdivisions are dotted around outside of city centers, treatments will continue to be scattered and will not provide for comprehensive treatment across the forests.

Due to unnaturally high stand densities and fuel loadings, there would continue to be the potential for disturbance processes to affect the landscape negatively, such as insect outbreaks, diseases, and wildfires. In a national poll, 73% of voters identified wildfires as a major threat to forests and 68% identified insects and disease (Fairbank 2011). Of great concern to maintaining high recreational values is a high potential for large, high severity crown fires to occur in the project area. If a large stand-replacing fire swept through the area, it could completely destroy or seriously damage the numerous recreation developments and recreation settings located in the project area, and outside. The loss of trees and vegetation and potential for severe erosion following a wildfire could seriously damage recreational settings, and the quality of life of locals and other national forest visitors who value forest recreational opportunities and facilities could be negatively affected for decades. Tourism may also be negatively affected due to post-fire closures to ensure public safety or if tourists substitute other locations than a visit to the 4FRI area due to the negative effects a large wildfire could have on recreation resources. Hesseln et al (2004) found the number of adversely burned acres affected demand for recreation for both hikers and bikers. As the number of adversely burned acres increases from zero to 100,000 acres, hiking trips drop from 14 to 13 trips and biking drops from 15.6 trips to 12.9 trips.

The amount of smoke produced from burning is dependent upon fuel loadings, weather, and ventilation and other variables. Smoke from high severity wildfires would be denser and of longer duration than pile burning or prescribed fire. The latter two type of managed fire could be scheduled to take advantage of weather and good ventilation. Similarly, if a large scale insect or disease outbreak occurred, recreation settings would be negatively impacted, and provision of recreation opportunities could be limited or eliminated until forest visitors find that the forest has recovered sufficiently to engage in the activities they enjoy in the settings they seek.

Will project activities affect provision of a variety of recreation opportunities? (Measure: acres of opportunities provided and percent of reported visitor use)

The No Action alternative would not immediately change recreation opportunities or visitor use in the project area. The long term stability of recreation settings and provision of recreation opportunities is in question. High severity wildfire or large scale insect or disease outbreaks could alter provision of recreation opportunities for decades following such an event. In the short term, there would be no change in recreation opportunities. In the long term, up to 589,923 acres could be affected in the event of large scale, high severity wildfire or insect or disease outbreak.

High profile recreation sites such as campgrounds, and designated trails would continue to be available to recreation users in the short term. In the event of large scale disturbances such as wildfire or insect and disease outbreaks, these places could be effected negatively because of unstable conditions, or lack of capacity to reconstruct areas. Unstable conditions could result in closures or long term reroutes until areas stabilized and can be reconstructed.

Will project activities result in substantial interference with the nature and purposes of the Arizona National Scenic Trail or adverse impacts to the Trail corridor?

No 4FRI treatments are proposed in the no action alternative, although the rate of current project planning and implementation would continue in the project area. The Arizona National Scenic Trail (Arizona Trail) would continue to be available to recreation users. There would be continued buildup of fuels and increased risk to recreation opportunities and the scenic qualities for which the trail was designated. In the event of large scale disturbances such as wildfire or insect and disease outbreaks, segments of the trail could be effected negatively because of unstable conditions such as windfall of dead trees, eroded trail tread or washed out trail tread in steep locations, and lack of capacity to reconstruct areas. Unstable conditions could result in closures or long term reroutes until the trail could be stabilized and reconstructed. If this were to occur in a large enough area, there would be substantial interference or adverse impacts to the Arizona Trail.

Will smoke from pile burning and prescribed burning affect provision of recreation opportunities? (Measure: describe and compare potential effects)

Effects would be similar to current conditions, where there are occasional short term effects from pile burning or prescribed burning from the No Action alternative.

Will the proposed restoration activities diverge from reference conditions identified for the forest and in the mapped Recreation Opportunity Spectrum settings? (Measure: acres meeting ROS settings)

At present, up to 587,923 acres in the project area diverge from reference conditions identified for the forest. Forest conditions do not meet the project purpose and need. The ROS settings are currently natural appearing, but forest conditions make the settings vulnerable to wildfire and insect or disease outbreaks.

Will proposed temporary road construction or other management activities result in inconsistencies in the ROS settings in the project area? (Measure: miles of roads or acres of treatment in ROS classes impacted by roads in the project area)

No change from existing conditions where there are short term decreases in ROS class settings following mechanical vegetation management or prescribed fire from implementation of current projects in the analysis area.

Cumulative Effects

The cumulative effects area is the ponderosa pine forest on the Coconino and Kaibab NF. The cumulative effects period is 20 to 30 years.

Past human activities and natural disturbance processes have influenced the current condition of the project area. Management activities and natural processes have affected, or continue to affect, vegetation structure, spatial arrangement and pattern, composition and diversity, natural processes (such as fire), and movement towards increased forest resiliency and function. Table 18 provides an overall assessment of positive and negative cumulative effects of past, present and future projects on recreation. The discussion following the table explains the effects or trend.

Table 18 Comparison of relative cumulative effects to recreation for No Action.

Activity	Relative Contribution to Cumulative Effects to Recreation							
	Positive Effects/Trend				Negative Effects/Trend			
	I/S	Low	Moderate	High	I/S	Low	Moderate	High
Past Vegetation Management								X
Present/Future Vegetation Management			X			X		
Past Fire		X						X
Present/Future Fire			X				X	
Motorized Travel Management				X		X		

The cumulative effects of the No Action alternative and past, present and future projects will not immediately change the provision of recreation opportunities and the associated recreation settings on the forests. Forest users seek the unique recreation settings associated with the ponderosa pine forest and consistently use these areas throughout the year, including for climatic relief in the summer and snow-related opportunities in the winter. The existing overstocked forest conditions and susceptibility to high severity wildfires places recreation sites and settings at high risk. Despite the risks to recreation settings, the FS has been able to provide high quality recreation opportunities to increasing numbers of users, but the agency's capacity is strained, and in some areas of concentrated use, the resource capacity is strained as well. With increasing demand for ponderosa pine forest settings, declining forest health and sustainability, the cumulative impacts from past wildfires and past timber sales resulting in unhealthy stands are expected to cause a decline in the quality and availability of satisfactory recreation settings under the No Action alternative, as well as slow decline in provision of distinct ROS classes.

The alternative A would result in the forest being more susceptible to large intensity wildfire or beetle attack. This would result in a decrease in recreation opportunities while at the same time, the desire for recreation use is increasing as a result of population growth and the public is increasingly dependent on national forests for recreation and leisure activities. Thus, this alternative would result in a cumulative decrease in the ability of the Coconino and Kaibab National Forests to meet recreation demands over the long term.

Past vegetation management activities resulted in an even-aged forest structure that is generally undesirable for recreation settings. It contributed to the scarcity of large, mature trees, and has not resulted in a forest with a more open structure, two setting characteristics (Ryan 2005) that have been identified as desirable to forest users. Past fire suppression activities have contributed to overstocked forest conditions, increased fuels, and decreased understory vegetation health. The current and planned vegetation management treatments and burning projects on both forests, as well as opportunities for managed wildfire result in cumulative improvements in forest health and

sustainability in the ponderosa pine, but are at such a small scale that the benefits to the recreation settings in the ponderosa pine forest on the Coconino and Kaibab are small and localized. In the event of a large, high severity wildfires, or large scale insect infestation resulting from existing conditions, the desired recreation settings, and ROS class characteristics forest users seek would be so altered that the cumulative effects would result in a lack of desired recreation settings and long term changes in ROS classes.

Motorized Travel Management implementation in combination with the No Action alternative is expected to have mostly positive effects on recreation settings due to prohibition of cross country motorized travel. The quality of many recreation settings in ROS classes were declining due to increased motorized use and increasing occurrences of cross country travel. Present and future activities may result in degradation along heavily used camping corridors, but these will be small and localized.

Desired recreation setting characteristics such as large, mature trees, healthy understory, and diversity of tree age classes, sizes, and species are also at high risk from the effects of climate change. While drought cycles are common in the Southwest, increasing temperatures and decreases in precipitation in combination with overstocked forest conditions and high fuel loads are predicted to result in an increase in high severity wildfires (Westerling et al 2006, Marlon et al 2012, CLIMAS 2011). Unmanaged forests have shown increases in tree stress and mortality as a result of global warming, and old, mature trees are especially vulnerable (Ritchie et al 2008, Van Mantgem et al 2009, Williams et al 2010). Increased tree mortality and loss of large, mature trees would result in a cumulative decrease in recreation settings.

Alternative B

Under this alternative, it is expected that there would be some short-term direct and indirect effects to recreation settings and user expectations. Only portions of the project area would be treated at one time, although there may be vegetation treatments, pile burning and/or prescribed burning, or other activities occurring in that portion at the same time.

This alternative would cause short term and temporary decreases in provision of recreation opportunities on parts of the Coconino and Kaibab NF. Some forest users would be dissatisfied with their lack of access to portions of the project area during management activities such as thinning projects and prescribed burning. Indirect effects would include recreation user and hiker displacement, increased use of special areas and designated Wilderness, and potential crowding in areas not receiving forest management treatments.
The completion of restoration activities would help protect 384,966 acres of treated vegetation, and 583,330 acres using prescribed fire from large-scale disturbance across both national forests. These activities would help to assure long-term provision of recreation opportunities.

Recreation Experience
Direct effects of vegetation management include short term displacement of recreationists during implementation (campers or hunters redirected or portions of trails closed) or visitor dissatisfaction from not being able to camp or recreate in their favorite location. It is expected that recreationists will use the substitution behaviors they reported in (see table 13) including coming back another time, going elsewhere for a different activity, going elsewhere for the same activity, going to work, staying at home or another substitution. Design criteria and the implementation plan include provision of information about treatment and burning locations will

help to inform visitors of places to avoid or other locations that are not receiving active treatments.

Campground users at Kaibab Lake and White Horse Lake campground, as well as recreationists at Oakhill Snowplay Area and Garland Prairie recreation sites on the Kaibab NF would experience short term disruptions in recreation settings and scenic quality. There could be evidence of mechanical treatment including stumps, skid trails, slash pile and log decks from mechanical treatments, as well as blackened circle from burning slash piles and/or chipped or masticated slash. In addition, there could be evidence of prescribed burning including blackened ground, charred branches or logs, ashes, blackened tree boles, and small groups of trees killed from fire effects. These would last one to five years until vegetation greens up and grows high enough to obscure stumps, disturbed ground, and blackened areas. Vegetation would respond to nutrient availability and additional sunlight, and should become more abundant and vigorous (Noble 2014).

Direct effects of forest thinning include short term displacement of recreationist during implementation, temporary decrease in the quality of recreation settings due to the presence of slash, skid trails, log landings, temporary road construction, and creation of dust and noise from logging operations and log hauling. Logging operations including loss of herbaceous cover, disorderly management activities and noise and dust, as well as lack of information have been found to decrease the quality of recreation settings and user satisfaction (Ryan 2005).

Logging operations affect recreation settings by the creation of residual stumps that are visible; the tree skidding that results in vegetation trampling or removal and creation of bare ground along skid trails; denuded log landings because of vehicular traffic from skidding and loading logs into log trucks, as well as soil compaction due to the vehicular traffic as well as the stacks of logs.

There are often heavy concentrations of bark and saw dust left on log landings that may slow or inhibit growth of vegetation. Slash branches and limbs from trees detract from the quality of recreation settings and may result in the perception of poor management (Ryan 2005). Design criteria and the implementation plan would include treating slash, but the treatment method and location would have different effects as follow.

Slash may be left in the woods or concentrated at log landings. Hand piling in small piles scattered through the forest are less visible, and have less effect on recreation settings than large machine piles. Machine piles are pushed together using mechanized equipment such as bulldozers. Mechanical piles placed away from roads, trails and other recreation use areas would be less visible than those placed at the edge of log landings near or directly on roads. Machine piling would result in vegetation tramping or removal, and displacement of ground cover such as pile needles, vegetation, rocks, and downed wood that is pushed into the piles.

Slash may also be processed for other uses or chipped or shredded at log landings. Processing would not affect recreation settings. Chipping or shredding and scattering the processed material has little to no effect on recreation settings. There would be some noise and dust created from chipping, shredding and spreading the slash in developed and dispersed recreation areas.

Dust from log trucks or trucks hauling biomass would be the heaviest during dry months, and would result in loss of visibility, may cause user dissatisfaction. Many users would find it unpleasant and disruptive if they are driving or recreating in the vicinity of haul routes.

Temporary closures and providing visitor information about the locations of logging operations will assist visitors in making decisions about where they want to recreate. Scattered communities, homes and neighborhoods on private land outside of city centers may be adjacent to forest roads that will be used for transporting logs or processed slash. Noise and dust from the operations may be irritating and disruptive. Dust mitigation along main haul routes would help reduce dust and result in safer driving conditions especially during dry months.

Direct effects of pile burning, prescribed burning and fire line preparation have the potential for short term displacement of recreationists during implementation (campers may need to be moved out, trail users may not be able to use a trail or are redirected during burning operations), or visitor dissatisfaction (seeing slash piles or pile burning, smoky conditions from pile or prescribed burning while people are visiting the area); however, these effects are expected to be of short duration and intensity (fire line preparation would likely last less than a year and smoky conditions in any one particular area are likely to last a week or less).

Fire line preparation may include construction of cleared fire line (to bare soil surface), raked areas, and vegetation trampling from use of administrative motorized vehicles along portions of fire lines or creating of safe areas. There may be some illegal use of the fire lines by motorized vehicles during implementation. Design criteria and the implementation plan will close off fire line access points from roads and trails, and slash, rocks and pine needles will be used to disguise the first visible portion after implementation is complete.

The immediate effects of pile burning include small (less than one-tenth of an acre) bare, blackened areas that may persist in this condition until vegetation begins to move in or sprout usually within 1-3 years following burning. The immediate effects following prescribed burning include blackened ground, dead seedlings, scorched bark and needles, and some burned trees. The majority of these effects will persist for about a year until red needles fall, vegetation recovers and black fades. Burned trees will be evident for a longer period of time and create contrast with nearby green vegetation. Although some visitors may prefer to not see any signs of fire in the forest, or recreate in recently burned areas, the effects of low and some moderate severity fires are beginning to be accepted by the public as an integral part of a healthy forest landscape (Toman et al 2011).

Dispersed Recreation Activities

Dispersed Camping: There are approximately 220 miles of dispersed camping corridors along the designated road system on the Coconino NF portion of the project where restoration activities will take place. This represents about 37% of designated camping corridors on the Coconino NF. About 4.2 percent of visitors to the Coconino report that they dispersed camp in undeveloped areas (Forest Service 2012). Direct effects would include camper displacement along some of the designated camping corridors during implementation when there are temporary closures. Not all areas would be treated at one time, so displacement would be based on places where active treatment implementation is taking place. Indirect effects of restoration activities could result in some crowding in the 380 miles of designated camping corridors outside of active treatment portions of the 4FRI project area. Other campers may choose to substitute another place or forest rather than experience crowding. Road signing and use of temporary administrative closures will alert users to management activities. Mitigations to provide visitor information about the location of restoration activities as well as places where there are no activities planned may help reduce visitor frustration about finding a camping location and assist campers in making choices about

where they will engage in camping activities.

In some areas, treatments would have the long-term positive effect of opening up areas in dispersed camping corridors that were previously difficult to access or inaccessible to motor vehicles as a result of dense thickets of trees (Coconino NF). For example, FR 222 off of Highway 180 would be a good location for RV camping, but it is inaccessible due to too many trees.

The Kaibab NF provides short road segments and may in the future provide for camping corridors for recreation access including dispersed camping. Less than half of the short road segments would be affected by restoration activities. Approximately 9.2% of recreationists indicated that they dispersed camp in undeveloped areas (Forest Service 2012c). Direct effects would include camper displacement to other areas if restoration activities temporarily close the road spurs. Other campers may choose to substitute another place or forest rather than experience crowding. Indirect effects of restoration activities could result in some crowding in recreation access points outside of the 4FRI project area. Mitigations to provide information about the location of restoration activities as well as places where there are no activities planned may help reduce visitor frustration about finding a camping location and assist campers in making choices about where they will engage in camping activities.

Winter Activities: Winter snowplay activities are not likely to be effected by 4FRI project activities. However, cross-country skiers who do not typically use groomed trails could be temporarily displaced in active management areas if restoration activities occur during the winter.

Trails: Hikers and motorized users using the developed trail system may be temporarily displaced, have to user trail or road reroutes, or have to change plans if trails or portions of trails are temporarily closed for restoration activities. Appendix B of this report includes a list of the trails that occur in the project area.

The Arizona National Scenic Trail (Arizona Trail) passes through the 4FRI project area from near Mormon Lake at the south and north to the project boundary at FR 523, and again on the western boundary of the project area on Tusayan Ranger District. Of the approximately 95 miles of the Arizona Trail route within the project area, approximately half, or about 44 miles would receive restoration treatments. Table 19 shows the types of treatments and miles by treatment that are proposed. Not all 44 miles of the Arizona Trail would be treated at the same time.

Table 19 Proposed treatments and miles of treatments on the Arizona Trail.

Proposed Treatment	Alternative B Miles*	Alternative C Miles*	Alternative D Miles*	Alternative E Miles *
Aspen	0.5	0.5	0.5	0.5
Burn Only	4.4	5.4	2.7	5.4
No Treatment	51.5	51.5	54.0	51
dPFA-UEA 40	2.0	2.0	2.0	2.0
Intermediate Treatment 10	2.8	2.8	2.8	1.7
Intermediate Treatment 25	2.1	2.1	2.1	2.0
Intermediate Treatment 40	1.1	1.1	1.1	1.1
MSO Restoration Treatment	9.6	8.9	9.6	9.6
MSO Target Treatment	1.2	1.2	1.2	1.2

MSO Threshold Treatment	0.2	0.2	0.2	0.2
Operational Burn	3.7	2.1	2.9	2.1
Grassland Mechanical Treatment	0.0	1.3	0.0	1.1
PAC-Mechanical	0.1	0.1	0.1	0.1
PFA-UEA 10	0.1	0.1	0.1	0.1
PFA-UEA 25	0.1	0.1	0.1	2.1
Savanna	3.2	3.2	3.2	0.1
Stand Improvement 10	0.3	0.3	0.3	0.4
Stand Improvement 25	0.1	0.1	0.1	0.1
Stand Improvement 40	1.4	1.4	1.4	1.4
Uneven Aged 10	1.0	1.0	1.0	1.0
Uneven Aged 25	4.4	4.4	4.4	4.4
Uneven Aged 40	5.4	5.4	5.4	7.4
TOTALS	**95.0**	**95.0**	**95.0**	**95.0**

*Numbers are based on unofficial Arizona Trails GIS layers, and are approximate.

Some trail users will be dissatisfied that they cannot use the trail they chose on a particular trip, and they may have a sense of general degradation of their hiking experience due to recovery times for trailside vegetation, visibility of treatments or trail reroutes. There may some crowding on trails due to user displacement outside of the treatment area, or within the treatment area where actions have not been implemented or have been completed. Trail users may be less satisfied with a substituted trail or road reroute because it is less scenic or includes motorized vehicle traffic. Trail hikers could experience dust from vehicles and may be at slight risk from passing vehicles. Through hikers on the Arizona Trail may be disappointed that they have been provided an alternative route, and are not hiking the official trail.

The trail side vegetation treatments would follow the same treatment practices as the stand they occur in would receive (and would be subject to the same restrictions). Only non-wilderness portions of trails that access Designated Wilderness areas would receive treatment. Mitigation measures allow for skid trails to cross forest system trails, and use of the trails as non-motorized fire control lines during prescribed burning with district recreation staff coordination, but do not allow trails to be used for skidding. Mitigations also require trails be returned to pre-management activity conditions as soon as possible following completion of activities. Visitor information will be available prior to implementation of each are of management activities so that trail users can make informed decisions as to where to recreate and anticipate trail reroutes that would affect their scheduling or trail planning logistics.

There would be short term and temporary changes in ROS classes as well as decreases in the scenic quality of trailside recreation settings due to restoration activities. These could include visible slash piles, skid trails, and log landings on nearby roads, increased noise from mechanical thinning, blackened areas where slash piles were burned, and blackened understory, singed needles and individual or small groups of burned trees as a result of prescribed burning. There may also be short term contrasts along the trail if one side is included in a prescribed burn block, and the other side has yet to be burned. Following completion of treatments, trailside settings are expected to naturalize quickly (within 1-5 years) and the scenic quality of the settings would be improved. Understory vegetation is expected to respond and become healthier and more abundant over time which could increase the enjoyment of hiking when wildflowers and shrubs are

blooming, or during fall color change. Reducing the density of vegetation will also provide more and better views out through the forest from trails. It will also help assure the sustainability of the trail and associated vegetation.

Hunting/Fishing: Hunters and anglers would continue to be able to engage in these activities. There could be some temporary closures in areas where active restoration treatments are occurring that would temporarily displace hunters in portions of hunt units or anglers at dispersed lakes or campgrounds adjacent to lakes. Mitigations to provide information about road closures, active treatment areas, pile burning and prescribed fire would be available to users and may help reduce visitor dissatisfaction resulting from restoration treatment activities.

Firewood Cutting: Fuelwood gathering is a permitted activity. The Kaibab and Coconino NF identify where fuelwood gathering can be conducted, and the 4FRI project will not affect the permitting process. There may be some short term and temporary road closures that would cause fuelwood gatherers to have to move to another location. There may be indirect benefits to fuelwood gatherers if thinned areas are opened to the public for firewood prior to burning slash piles or prescribed burning.

Recreation Opportunity Spectrum Classes
Direct and indirect effects to recreation settings from mechanical treatments would result in short-term (immediate to 5 years), temporary changes in up to 72% of ROS settings quality (Urban to Roaded Natural) in the project area. The short term effects would persist one or more seasons until activity slash is treated and the treated area recovers to an “unaltered” or “undisturbed” natural appearance. Effects of mechanical treatments are expected to take longer (immediate to ten years) to recover in the two semi-primitive ROS settings since these would have less evidence of treatment or development to begin with and would require more time to naturalize. Twenty eight percent of the project area is in the two semi-primitive ROS settings in the project area. Mitigation measures have been designed to ensure that direct effects of project activities are short-term, and important recreation values are protected in the long-term. ROS classes are expected to be changed one to five years after treatment as a result of the restoration activities, but following completion of vegetation treatments should display many of the characteristics described for each setting.

As required in the Kaibab Forest Plan, these temporary changes in ROS classes are documented in this report, and the timeline for meeting the mapped ROS classes is 15 years from the beginning of project implementation (5 years following the last projected treatment). There will be one exception to this for aspen treatments. Since these activities require fencing or creation of barriers until trees can withstand ungulate grazing, it is anticipated aspen stands will not meet desired ROS classes until at least 20 years following project implementation.

Will project activities affect provision of a variety of recreation opportunities? (Measure: acres of opportunities affected)

The proposed action would result in some reduction of recreation opportunities during active forest thinning and prescribed burning. It is estimated that up to 45,000 acres of mechanical thinning and up to 40,000 acres of prescribed burning would occur each year in the project area. Areas may be temporarily closed to the public due to hazardous conditions which would result in forest user displacement and user dissatisfaction. There could also be an increase in crowding in nearby untreated forest areas. The 2012 Coconino NF NVUM reported approximately a quarter of respondents rated their experiences between 6-10 on the issue of crowding in undeveloped areas

(a rating of “1” is “hardly anyone there”, and a rating of “10” indicates “overcrowding”. Since this project would affect 40,000 to 45,000 acres at one time, or about 2% of the South Kaibab and Coconino NF’s, it is unlikely that crowding ratings would increase more than the 25% that already identified crowded conditions.

Will project activities result in substantial interference with the nature and purposes of the Arizona National Scenic Trail or adverse impacts to the Trail corridor?

Approximately 95 miles of the Arizona Trail are within the boundary of the project area. The majority of the trail is on the Mormon Lake and Flagstaff Ranger Districts of the Coconino NF, and a shorter segment is on the Tusayan Ranger District of Kaibab NF. About 44 miles of the trail have mechanical and/or prescribed fire treatments proposed.

The effects from mechanical treatments would be short term (1-5 years). These effects could include disruption of trailside settings, evidence of skidding across the trail in isolated locations, tree stumps, visible slash piles or evidence of slash chipping or mastication, blackened circles from burned slash piles, blackened tree boles, and blackened vegetation. Typically within one to two years following mechanical treatment and/or prescribed fire, understory vegetation responds and screens disturbed ground, and stumps begin to grey out and are less noticeable.

The proposed mechanical restoration treatments would result in a more open and diverse forest. Views out from the trail would be visible where they were obscured by vegetation prior to treatment. Trailside vegetation would respond to availability of nutrients provided by prescribed fire.

Effects to users, such as dissatisfaction from having to use trail reroutes, or from temporary closures due to operational hazards would be short term. Some segments of the Arizona Trail would be open at all times during project implementation. Some users may be disappointed that they were not able to hike the “official” Arizona Trail in some segments. Information would be provided by Forest Service and Arizona Trail Association regarding upcoming treatments, trail reroutes, or temporary closures and these would help users make decisions about the timing and location of their hikes. Through hikers would have the information needed to make adjustments in their food and water resupply plans and other logistical considerations.

The health and sustainability of the ponderosa pine landscape within the project area and in which the Arizona Trail is located is at substantial risk from large scale, high severity fire. Failure to address this risk could result in drastic impacts to the national scenic trail qualities of the Arizona trail corridor as has been seen in small scale along other sections of the trail where wildfires have had devastating effects. This project would meet both the requirements of 16 USC 1246 to “harmonize with and complement multiple uses”, as well as “conservation and enjoyment of significant scenic, historic, natural and cultural qualities” and enjoyment of significant scenic, historic, natural, and cultural qualities of the area” in the long term, although the recreational potential in some sections of the trail would be diminished in the short term while project work and recovery takes place. The proposed restoration treatments (mechanical and prescribed fire) comply with forest plan direction for both the Coconino and Kaibab NF. Design criteria and the implementation plan have been developed that would help to protect the trail tread and trailside scenery. The treatments would not result in substantial interference or long term adverse impacts to the Arizona Trail. There would be short term disruptions and dissatisfaction of trail users on some segments of the trail during the duration of the project. In the long term, the health and

vigor of trailside vegetation would be improved, views expanded, and risks from potential disturbances reduced for the trail and recreation opportunity it provides.

Will smoke from pile burning and prescribed burning affect provision of recreation opportunities? (Measure: describe and compare potential effects)

Smoke from pile burning would result in short term effects in portions of the project area after thinning has occurred and slash piles are treated. Effects could include user dissatisfaction, user displacement, and temporary reduction in setting qualities due to smoke obscuring the surrounding scenery. Pile burning is often completed on the day of ignition but could last an additional day if there are large fuels present in piles. Slash piles in developed recreation sites have timing restrictions for burning to avoid high use seasons. Design criteria such as timing burning for adequate ventilation, avoiding high use holidays, and provision of visitor information will reduce these short term effects.

Smoke from prescribed burning would also result in short term effects where widespread smoke from a particular burn block may be present for several days. In some isolated places there could also be lingering smoke from burning stumps or roots for several weeks. Effects could include user dissatisfaction, user displacement and short term reduction in setting qualities due to smoke obscuring the surrounding scenery. In developed recreation sites, forest users may be dissatisfied with the ash, charcoal and partially burnt logs or stumps immediately following prescribed burns. These effects should be short term (6 months to 1 year) and will become less noticeable following precipitation that helps to settle the ashes, and green up of the areas. Initial prescribed burns would produce more smoke than follow up burns since accumulated fuels will be more abundant. It is possible that several burn blocks will be ignited during suitable burning conditions.

Indirect effects could include smoky conditions outside of the project area in communities or at developed recreation sites, in Designated Wilderness, along trails or other places. These would be short term and temporary, but could repeatedly affect areas near the project over the approximately ten years of implementation.

Mitigations such as timing for adequate ventilation, coordination with other agencies, avoiding high use holidays, and provision of visitor information will reduce these effects or provide needed information so that individuals can make choices about their recreation activities.

Will the proposed restoration activities diverge from reference conditions identified for the forest and in the mapped Recreation Opportunity Spectrum settings? (Measure: acres meeting ROS settings)

This alternative provides for the long-term protection of recreational settings and facilities on 384,966 acres where mechanical thinning and burning would occur by improving stand conditions and reducing fuel loading, and will lower the risk of high severity fire somewhat on 198,364 acres where prescribed burning only will occur. Maintaining healthy, green forests and reducing the risk of large scale, high-intensity fires in the project area will have a positive effect on protecting and maintaining high quality recreation settings into the future.
There would be short term and temporary changes in ROS classes as well as decreases in the scenic quality of trailside recreation settings due to restoration activities. These could include visible slash piles, skid trails, and log landings on nearby roads, increased noise from mechanical thinning, blackened areas where slash piles were burned, and blackened understory, singed needles, individual or small groups of burned trees, ash, charcoal, and partially burnt logs or stumps, remnants of branches and tree boles. There may also be short term contrasts along the trail if one side is included in a prescribed burn block, and the other side has yet to be burned.

Following completion of treatments, trailside settings are expected to naturalize quickly (within 1-3 years) and the scenic quality of the settings would be improved.

Will proposed activities such as temporary road construction or other management activities create inconsistencies in the ROS classes? (Measure: miles of roads or acres of treatment in ROS classes impacted by roads)

Restoration activities will use the designated forest road system for access to mechanically treat vegetation and conduct pile burning and prescribed fire activities. The majority of the treatments will occur in areas designated as Roaded Natural ROS classes. Table 20 summarizes the number of miles of designated roads by ROS class in the 4FRI project area. Recreationist will use some of the same roads to access recreation opportunities.

Driving for pleasure and viewing scenery and wildlife are favorite activities of many visitors (USDA 2012, 2012c). Drivers, scenery and wildlife viewers will continue to have access to the designated forest road system to engage in these activities. The quality of scenery viewing will be reduced in the short term (1-3 years) in active treatment areas during project implementation due to presence of slash piles and evidence of vegetation removal activities. Following pile burning and the first prescribed fires, the areas will begin to recover and naturalize. Design criteria and the implementation plan prioritize slash pile burning along major road corridors so that these areas will recover their scenic quality more quickly. Information about scheduled burns will also be available so that recreation visitors can make informed decisions about choosing the places they recreate.

Table 20 Miles of NFS designated roads by ROS classes in the approximately 598,764 acre project area*.

Location	**Miles by Recreation Opportunity Spectrum class***				
	Urban	Rural	Roaded Natural	Semi-primitive Motorized	Semi-primitive Non-motorized
Flagstaff RD (RU 1, 2, parts of 3 and 4, 5)	36	167	2464	117	308
Williams RD (RU parts of 3 and 4)	0	282	946	315	51
Tusayan RD (RU 6)	16	39	249	3	35
TOTALS	52	488	3,659	435	394

*Only a portion of the roads will be used as haul routes.

There will be log truck and other activity related traffic on the designated road system, although not all roads will be used as haul routes. Approximately 2,783 miles of haul routes have been identified in the areas proposed for treatment within the 4FRI project area this represents about 45% of the designated road system found in the project area on both forests. Table 21 below displays the miles of haul road by ROS class. Not all of these routes will necessarily be used, and hauling will not occur on all roads at the same time. Recreationists can expect increased noise, dust and traffic on some haul routes. As noted above, there will also be temporary decreases in

the scenic quality of recreation settings during implementation.

Table 21 Miles of proposed haul roads by ROS classes in the proposed treatment areas

Non-Forest	Urban	Rural	Roaded Natural	Semi primitive Motorized	Semi primitive Non-motorized	Total
73		156	1978	485	87	2,783

Approximately 40 miles of roads will be reconstructed or improved as part of project implementation. Road improvement activities are defined as activities that result in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function. Activities included in road improvement include, but are not limited to, widening corners to improve turn radiuses, straightening of road segments to improve haul safety, installing turnouts to improve haul safety, and changing alignments at road intersections to improve site distance and haul safety. These activities may result in limited removal of vegetation. These activities will occur on approximately 30 miles of roads within the project area. Road relocation may include relocating roads out of drainages, construction of rock rip-rap, the installation of new culverts, and the construction of low water crossings. Up to 10 miles of road within the project area would have this road treatment.

There would be short term disturbance and temporary changes in ROS classes and roadside recreation settings during road improvement activities. Recreation visitors may be inconvenienced and have to wait during some activities, or roads may be temporarily closed causing displacement. Road relocation would result in a safer road to travel on. It would also result in short term disturbances such as increased bare ground and decreased roadside visual quality in scattered locations. Long term effects would be improved water quality at stream crossings, and safer and better maintained roads for forest user enjoyment.

Road decommissioning will occur on 860 miles of roads. This includes 726 miles of existing, closed system roads, and up to 134 miles of unauthorized roads. Table 22 indicates miles of proposed decommissioning by ROS class. Decommissioning includes applying various treatments, including one or more of the following:

1. Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;

2. Blocking the entrance to a road or installing water bars;

3. Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed;

4. Completely eliminating the roadbed by restoring natural contours and slopes; and

5. Other methods designed to meet the specific conditions associated with the unneeded road.

Table 22 Miles of proposed decommissioned roads/routes by ROS classes

Urban	Rural	Roaded Natural	Semi primitive Motorized	Semi-primitive Non-motorized	Total
5	32	553	185	85	860

Short term effects of road decommissioning would include ground disturbance and sedimentation and noise disturbance to recreationists. Short term effects would last from 3-10 years as the project activities rotate around the project area. There would be a long term improvement of recreation settings as vegetation is established, soil erosion is minimized and there is decreased disturbance from motorized vehicles. Once recovered, these former routes are often not apparent to the casual user. Decommissioning 860 miles of roads will improve recreation settings over time and will improve ROS classes, especially in the semi-primitive non-motorized ROS class where all 85 miles of haul routes will be decommissioned.

About 520 miles of temporary roads and would be constructed to support restoration activities. Construction may include tree removal, ground disturbance, installation of drainage structures, road blading and other disturbances. Following implementation, the temporary roads would be obliterated using techniques noted for road decommissioning. Temporary road construction would result in short term disturbance and temporary changes in ROS classes as noted in Table 23. New linear features would be added to recreation settings reducing the scenic quality for 3-10 years. There may be some increase in illegal motorized vehicle use of these roads until they are decommissioned. Once these roads have been decommissioned, they are usually not apparent to the casual user. Mitigation measures will be used to close off entrance and exit locations of these roads, as well as use of Best Management Practices (see soil and watershed sections in the DEIS).

Table 23 Miles of proposed temporary roads by ROS classes

Rural	Roaded Natural	Semi-primitive Motorized	Semi-primitive Non- motorized	Total
12	360	122	26	520

In addition, closed system roads would provide access for project implementation within the project. Most closed roads are proposed to be reopened for restoration activities and then reclosed. Road management level 1 as defined in the FSH 7709.58, 10, 12.3 are “assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are “prohibit” and “eliminate.” Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.”

Maintenance level 1 roads have been used in the past to support management activities, were closed, and now will be reopened for use during project activities. The roads may require vegetation removal, blading, maintenance of drainage structures and other improvements in order to be used during project implementation. Upon completion of project activities, the roads would

be reclosed. Temporary road construction would result in short term disturbance and temporary changes in ROS classes. New linear features would be added to recreation settings reducing the scenic quality for 3-10 years. There may be some increase in illegal motorized vehicle use of these roads until they are decommissioned. Once the roads have naturalized, they are usually not apparent to the casual user and they will meet the existing ROS classes. Mitigation measures will be used to close off entrance and exit points of these roads, as well as Best Management Practices (see soil and watershed sections).

Closed roads slated for decommissioning will have similar effects as temporary roads; however decommissioning will result in the roads revegetating and becoming natural appearing over time. Since these roads would not be reopened, in the long term the decommissioned roads will meet and improve ROS classes.

Spring restoration and improvements would improve the resilience of these areas and make them more attractive to dispersed recreationists. Water in the Southwest is a rare feature, and people are attracted to it for recreation activities including hiking, picnicking, camping, scenery, wildlife and wildflower viewing. The proposed improvements may cause short term changes in the recreation settings, but would result in improvements in the setting characteristics and ROS classes over time. Seventy eight springs would be improved with this alternative. Mitigations to use native materials or natural appearing materials appropriate to the ROS setting would result in natural appearing improvements. The spring improvements would improve and meet ROS classes.
There are also 39 miles of channel restoration proposed would improve recreation settings over time. Mitigations to use native materials or natural appearing materials appropriate to the ROS setting and to consult the Landscape Architect regarding the project design would result in natural appearing improvements. The channel improvements would improve the settings and meet ROS classes.

Aspen treatments would take longer for recreation settings to be natural appearing in roaded natural and semi-primitive settings due to the need to fence or create barriers to ungulate grazing. Aspen groves are popular recreation settings for many users throughout the year, but especially for fall color viewing. The restoration activities would assure that aspen continue as a vital component within the ponderosa pine forest. There would be short to moderate term changes in ROS settings where aspen are treated. Aspen restoration requires that ungulates be kept out of sprouting trees until they are large enough to withstand the browsing pressure. Fencing and jackstraw piling are both proposed methods for keeping the ungulates out.

A total of 82 miles of fencing (spring restoration) and fencing and jackstrawing (aspen restoration) would cause temporary changes in the ROS class setting characteristics since the natural appearing environment would be somewhat altered. More developed settings would appear altered for a shorter time period since human alterations may be visible in these settings. Since the barriers must stay in place for many years, the primitive ROS settings would be altered for at least 20 years or until the trees can survive browsing. When the fencing is removed or jackstrawed trees burn or begin to break up and decompose, treatment areas would meet ROS classes.

This alternative will provide for restoration treatments along both utility corridors and road rights-of-ways. Mitigation measures to feather abrupt edges of corridors and rights-of-way should provide improve the ROS class compliance. Treatment strategies to feather edges and create

better transitions between the forest and clearing will make these linear features somewhat more natural appearing and would improve the scenic quality of recreation settings that are adjacent to or cross these features.

Understory vegetation is expected to be improved following restoration treatments as illustrated in Table 24. Based on information compiled for this project (Noble 2014), the mechanical treatments improve all understory characteristics, thinning and burning increase most understory characteristics with the possible exceptions of shrubs and Gambel oak. A healthier, more varied understory would result on improve recreation settings on at least 384,966 acres where thinning and burning would occur, as well as some improvement on 198,364 acres of prescribed burning only.

Table 24 Understory response to forest disturbance (Noble 2014).

Understory Characteristic	Changes Relative To Control Plots			Citation(s)
	Thinning	Thinning & Burning	High Severity Wildfire	
Species Richness	Increase	Increase	Increase (but includes a higher percentage of exotic species)	Stoddard et al. 2011
Total Biomass	Increase	Increase	Increase (but includes a higher percentage of exotic species)	Moore et al. 2006
Graminoids	Increase	Greatest Increase	Decrease	Griffis et al. 2001; Stoddart et al. 2011
Forbs	Increase	Greatest Increase	Increase	Griffis et al. 2001; Laughlin et al. 2004, 2005, 2006; Moore et al. 2006
Shrubs	Increase	Increase/ Decrease	Decrease	Huffman and Moore 2004; Griffis et al. 2001
Gambel Oak	Increase	Decrease	Decrease	Abella 2008
Soil Nutrients	Increase	Greatest Increase	Increase (greater pulse in magnitude, but with lower potential to affect plant growth over time)	Meyer et al. 2001; Gundale et al. 2005; Hart et al. 2005; Covington and Sackett 1992; Abella 2004
Actinomycete	Increase (after herbaceous vegetation increases)	Increase	Decrease (patchy response depends on site-specific severity)	Gundale et al. 2005; Hart et al. 2005
Arbuscular Mycorrhizae	Increase (after herbaceous vegetation increases)	Increase	Decrease (patchy response depends on site-specific severity)	Covington and Sackett 1984; Abella 2004
Community Composition	Increase	Increase		Covington and Sackett 1992; Abella 2004; Laughlin et al. 2008
Litter	Decreased Rate of Accumulation	Decrease	Decrease	Scudieri 2009
Native Species	Increase	Increase	Increase (in the long-	Griffis et al. 2001;

			term)	Laughlin et al. 2004, 2005, 2006; Moore et al. 2006
Exotic Species	Increase?	Increase (in short-term)	Greatest Increase	Griffis et al. 2001; Sabo et al. 2009; Stoddart et al. 2011

Forest Plan Amendments

Three non-significant site specific forest plan amendments are proposed on the Coconino NF forest plan for Alternative B:

Amendment 1. *Would add language to allow mechanical treatments up to 16-inch dbh to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre and post treatment, population, and habitat monitoring). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project.Definitions of target and threshold habitat would be added.*

While constructed features such as trails or recreation sites are generally placed outside of PAC's, older trail alignments or recreation sites may precede delineation of these areas, and may be located within or adjacent to PAC's. For recreation this would result in potential reductions in the risk of wildfire in MSO Protected Activity Centers (PAC's) compared to compliance with the existing forest plan language and direction. It would also open up these PAC's somewhat creating the potential for views beyond the immediate foreground. This would have a slight positive effect on recreation settings and scenic quality associated with the settings.

Amendment 2. *Would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,952 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.*

This amendment would help to meet the desired conditions for recreation including "recreation areas have deteriorated due to lack of natural processes such as fire and declining forest health, as well as provide high scenic and recreational values". It would also meet Coconino NF plan goals for recreation including: "Manage the recreation resource to increase opportunities for a wide variety of developed and dispersed experiences" goals and objectives "there is a range of recreational setting opportunities for people to enjoy the area's many scenic and aesthetic qualities. The diversity and quality of recreation opportunities, settings, and experiences are within acceptable limits of change to ecosystem stability and condition." It would make more progress toward restoration than implementing the existing forest plan direction. There would be improvement in recreation settings and scenic quality associated with the settings.

Amendment 3. *Would remove the cultural resource standard that requires achieving a "no effect" determination and would add the words "or no adverse effect" to the remaining standard. In effect, management would strive to achieve a "no effect" or "no adverse effect" determination.*

This amendment would not effect recreation resources associated with this project.

Cumulative Effects

The cumulative effects area for Alternative B is the ponderosa pine forests on the Coconino and Kaibab NF, and the cumulative effects period would be 20-30 years.

Past human activities and natural disturbance processes have influenced the current condition of the project area. Management activities and natural processes have affected, or continue to affect, vegetation structure, spatial arrangement and pattern, composition and diversity, natural processes (such as fire), and movement towards increased forest resiliency and function. Table 25 provides an overall assessment of positive and negative cumulative effects of past, present and future projects on recreation, and a discussion follows the table.

Table 25 Comparison of relative cumulative effects to recreation for Alternatives B.

Activity	Relative Contribution to Cumulative Effects to Recreation							
	Positive Effects/Trend				Negative Effects/Trend			
	I/S	Low	Moderate	High	I/S	Low	Moderate	High
Past Vegetation Management		X						X
Present/Future Vegetation Management				X		X		
Past Fire		X						X
Present/Future Fire				X		X		
Utility Corridor/Site Clearing						X		
Motorized Travel Management				X		X		
Road or Trail Construction		X				X		

The cumulative effects of Alternative B and past, present and future projects would have short term and local negative cumulative effects on the provision of recreation opportunities and the associated recreation settings on the forests. Forest users seeking ponderosa pine recreation settings may be displaced or restricted, and the quality of recreation sites may temporarily decrease during management activities on this project and other current or future projects. Long distance hikers may have trips disrupted or may be rerouted to different areas in the short term.

Alternative B would restore the ponderosa pine forest health and sustainability to about 500,000 acres; this combined with other restoration activities would decrease the risk of high severity wildfire or large insect outbreaks. Increasing numbers of recreation users and demand for ponderosa pine recreation settings will continue to strain the agency's capacity and in some areas of concentrated use, the resource capacity. With increasing demand for ponderosa pine forest settings, the large scale improvements to forest health and sustainability of this project and similar vegetation and burning projects such as Upper Beaver Creek Forest Restoration, Hart Prairie Forest Restoration, Marshall Forest Restoration, Rim Lakes Forest Restoration and others are expected to result in cumulative retention or improvement in the quality of recreation settings and an increase in the ability of the Coconino and Kaibab National Forests to meet recreation demands over the long term.

Past vegetation management activities resulted in an even-aged forest structure that is generally undesirable for recreation settings. It contributed to the scarcity of large, mature trees, and has not resulted in a forest with a more open structure, two setting characteristics (Ryan 2005) that have been identified as desirable to forest users. Past fire suppression activities have contributed to overstocked forest conditions, increased quantities of fuels, and decreased understory vegetation.

The current and planned vegetation management treatments and burning projects on both forests, as well as opportunities for managed wildfire, cumulatively result in improvements in forest health and sustainability in the ponderosa pine that are large and widespread. In the event of a wildfire, or insect infestation the restored forest would likely experience more typical low severity fire and small scale insect infestation. The cumulative effects to desired recreation settings and ROS class characteristics forest users seek would be maintained and improved. Utility corridor clearing in combination with Alternative B would result in short term and localized negative cumulative effects on both forests.

Motorized Travel Management implementation in combination with Alternative B is expected to have mostly positive effects on recreation settings due to prohibition of cross country motorized travel and decommissioning of user created routes and some existing forest roads. The quality of many recreation settings in ROS classes were declining due to increased, unconfined motorized use and increasing occurrences of cross country travel. Present and future activities may result in additional degradation along camping corridors, but these will be short term and localized. There would be positive cumulative effects and an overall improvement in ROS classes as a result of these activities. In some areas motorized restrictions resulting from the travel management rules may combine with temporary access restrictions that will be necessary under this alternative to make portions of the National Forest unavailable for motorized access.

Road and trail construction projects in combination with Alternative B will result in negative effects to small and localized recreation settings across both forests. Little new road construction is proposed now or in the future in cumulative effects projects. Motorized trails projects include new construction, road to trail conversion and route decommissioning in appropriate ROS classes. This will have positive cumulative effects in more primitive ROS classes when decommissioned routes naturalize, and expected characteristics are re-established.

Desired recreation setting characteristics such as large, mature trees, healthy understory, and diversity of tree age classes, sizes, and species are also at high risk from the effects of climate change. While drought cycles are common in the Southwest, increasing temperatures and decreases in precipitation in combination with overstocked forest conditions and high fuel loads are predicted to result in an increase in high severity wildfires (Westerling et al 2006, Marlon et al 2012, CLIMAS 2011). Unmanaged forests have shown increases in tree stress and mortality as a result of global warming, and old, mature trees are especially vulnerable (Ritchie 2008, VanMantgem et al 2009, Williams et al 2010). Alternative B and other restoration projects will cumulatively result in improved forest structure, composition and diversity and more resilient forest conditions, decreased tree stress and potential for decreased mortality.

Alternative C

The effects described in Alternative B would be the same for Alternative C with the exception of the number of acres restored. Approximately 10% more acres would receive mechanical and prescribed fire restoration treatments, about 1% more prescribed fire-only. This alternative would provide the greatest potential to reduce the risk of large scale, high-severity fires in the project area. It would have a more positive effect than Alternative B on protecting and maintaining high quality recreation settings over time. Alternative C would result in 10% more temporary changes in ROS classes during project implementation. Assuming a linear relationship, up to ten percent more forest users may be affected by the additional treatments.

Alternative C would construct up to 12 weirs[1] and 12 weather stations (disturbing approximately 3 acres) as part of watershed improvements and metrics. Effects to recreation settings would be to increase the visibility of human disturbances on 3 acres within the project area and remove these from potential recreation use. Design criteria are included in order to assure that constructed features use natural or natural appearing materials that reduce the visibility and contrast as much as possible.

Will project activities affect provision of a variety of recreation opportunities? (Measure: acres of opportunities affected)

The proposed action would result in some reduction of recreation opportunities during active forest thinning and prescribed burning. It is estimated that slightly more acres could be affected at one time. Areas may be closed to the public due to hazardous conditions which would result in forest user displacement and user dissatisfaction. There could also be a slight increase in crowding in nearby open forest areas.

Will project activities result in substantial interference or adverse impacts to the Arizona National Scenic Trail?

Table 19 (in effects analysis for alternative B) indicates the proposed treatments and number of treatments that would occur along the Arizona National Scenic Trail from alternatives B, C, E and E. Effects would be similar to those for alternative B.

Will smoke from pile burning and prescribed burning affect provision of recreation opportunities? (Measure: describe and compare potential effects)

Smoke from pile burning would result in short term effects in portions of the project area after thinning has occurred and slash piles are treated. Effects could include user dissatisfaction, user displacement, and temporary reduction in setting qualities due to smoke obscuring the surrounding visual quality. Pile burning is often completed on the day of ignition but could last an additional day if there are large fuels present in piles. Piles in developed recreation sites would be timed to be burned outside of high use seasons. Mitigations such as timing burning for adequate ventilation, avoiding high use holidays, and provision of visitor information will reduce these short term effects.

Smoke from prescribed burning would also result in short term effects where widespread smoke from a particular burn block may be present for several days. In some isolated places there could also be lingering smoke from burning stumps or roots for several weeks. Effects could include user dissatisfaction, user displacement and short term reduction in setting qualities due to smoke obscuring the surrounding visual quality. Initial prescribed burns would produce more smoke than follow up burns since accumulated fuels will be more abundant. It is possible that several burn blocks will be ignited during suitable burning conditions. Mitigations such as timing for adequate ventilation, coordination with other agencies, avoiding high use holidays, and provision of visitor information will reduce these effects or provide needed information so that individuals can make choices about their recreation activities.

[1] A weir is a constructed structure that restricts water flow into a defined area for ease of water flow measurement. The structure is often "V" shaped. The water flowing through the constriction can be measured up the walls, and is often measured in cubic feet per second.

Will the proposed restoration activities diverge from reference conditions identified for the forest and in the mapped Recreation Opportunity Spectrum settings? (Measure: acres meeting ROS settings)

This alternative provides for the long-term protection of recreational settings and facilities on 434,049 acres where mechanical thinning and burning would occur by improving stand conditions and reducing fuel loading, and will lower the risk of high severity fire somewhat on 155,211 acres where prescribed burning-only will occur. Maintaining healthy, green forests and reducing the risk of large scale, high-severity fires in the project area will have a positive effect on protecting and maintaining high quality recreation settings into the future.

Will proposed activities such as temporary road construction or other management activities create inconsistencies in the ROS classes? (Measure: miles of roads or acres of treatment)

See effects for Alternative B for roads and other management activities, this alternative would have similar effects.

Alternative C would construct up to 12 weirs and 12 weather stations (disturbing approximately 3 acres) as part of watershed improvements and metrics. Weir construction would result in short term decreases in ROS classes. Design criteria would be used so that natural or natural appearing materials are used in the weir construction, and the Landscape Architect would be involved in the design of the fixtures so that they would meet the ROS class. Weather stations are long term features. Design criteria would involve the Landscape Architect in locating the features so that they would be less visible to the casual observer, and would meet the ROS class requirements.

Forest Plan Amendments

Three non-significant forest plan amendments (see appendix B) would be required on the Coconino NF to implement alternative C:

Amendment 1 would allow mechanical treatments up to 17.9-inch d.b.h. to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs. These PACs would be managed for a minimum basal area of 110. It would allow low-intensity prescribed fire within 54 MSO PAC core areas. The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre- and post-treatment, population, and habitat). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project.

The amendment, which is specific to restricted habitat in pine-oak, would add definitions of target and threshold habitat. It would allow 6,299 acres of restricted target and threshold habitat to be managed for a minimum range of 110 to 150 basal area.

This alternative increase the size of trees that could be removed in 18 MSO PAC’s and allows use of low intensity prescribed fire within 54 PAC core areas. Old, large diameter trees are often an important part of the scenic quality of recreation settings. While constructed features such as trails or recreation sites are generally placed outside of PAC’s, older trail alignments or recreation sites may precede delineation of these areas, and may be located within or adjacent to PAC’s. For recreation this would result in more potential reductions in the risk of wildfire in MSO Protected Activity Centers (PAC’s) compared to compliance with the existing forest plan language and

direction, and more than would be implemented in action alternatives B, D, or E. It would open up these PAC's more creating the potential for views beyond the immediate foreground. This would have a somewhat greater positive effect on recreation settings and scenic quality associated with the settings than action alternatives B, D, or E.

Amendment 2 would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,653 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.

An exception to this amendment applies to about 38,256 acres of goshawk habitat. In response to feedback and comments received on treating less aggressively and leaving more large trees, canopy cover will be measured at the stand level on about 38,256 acres of goshawk habitat where there is a preponderance of VSS 4, 5 and 6

The effects to recreation would be the same as with Alternative B. The exception for less aggressive treatment would have no effect.

Amendment 3 would remove the cultural resource standard that requires achieving a "no effect" determination and would add the words "or no adverse effect" to the remaining standard. In effect, management would strive to achieve a "no effect" or "no adverse effect" determination.

There would be no effects to recreation from this amendment.

Compatibility with the Draft Coconino Forest Plan, and Kaibab Revised Forest Plan

Both the Kaibab and Draft Coconino revised forest plans have considered special places. Each has evaluated existing special areas, as well as potential wilderness, and other potential additions as appropriate to the forests. Some existing special areas and potential additions may overlap with proposed treatments in 4FRI alternatives. The analysis below identifies such areas, and addresses each individually.

Area 1: The Coconino NF Revised Forest Plan has identified West Fork of Oak Creek (within Red Rock-Secret Mountain Wilderness) as an eligible Wild and Scenic River. Figure 7 shows a typical ¼ mile buffer applied to the river corridor.

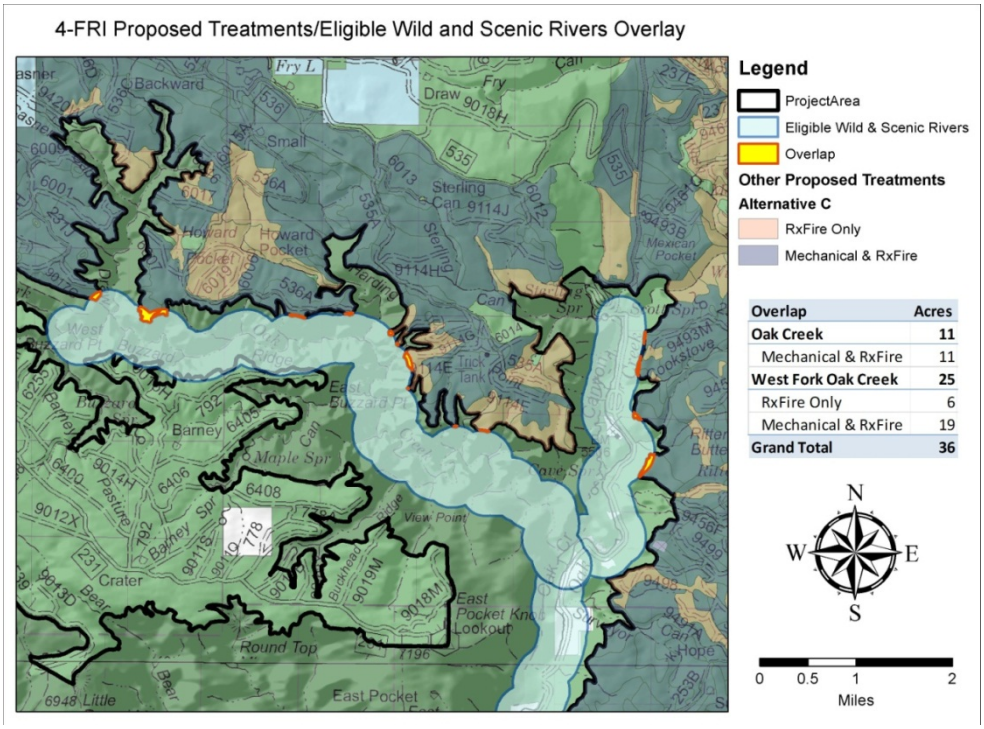

Figure 7 Coconino revised forest plan eligible river with overlap in 4FRI area.

The ¼ mile buffer would overlap with approximately 36 acres of proposed 4FRI treatments in Alternative C. These locations occur in areas less than 40% slope on top of the rim of the proposed river corridor. The overlaps are outside of the Red Rock-Secret Mountain Wilderness boundary shown in the darker green.

As noted in the Interagency Wild & Scenic Rivers Coordinating Council Technical Paper (IWSR Coordinating Council 2011) "Timber management activities on federal lands within WSR corridors must be designed to help achieve land-management objectives consistent with the protection and enhancement of the values that caused the river to be added to the National System. Management direction needed to protect and enhance the river's values is developed through the river planning process. WSR designation is not likely to significantly affect timber management activities beyond existing measures to protect riparian zones, wetlands, and other resource values as guided by other federal requirements." In addition, "Timber management activities on federal lands outside the corridor are managed to protect and enhance the values that caused the river to be designated. Measures needed to protect and enhance the river's values are developed through the river planning process and include management direction as necessary for lands adjacent to the corridor."

The areas that overlap the proposed WSR boundary already have mitigation measures for soil and watershed, scenery, and other resources (see 4FRI EIS as well as individual resource specialist reports). The proposed activities would help to protect potential values of the eligible wild and scenic river from the effects of wild fire. In Alternative C, there would be short term effects associated with mechanical treatment and prescribed fire as analyzed in the Recreation and Scenery sections of the EIS, as well as in this and the Scenery specialist reports.

Area 2: The Coconino NF Revised Forest Plan has identified Elden Environmental Study Area in

Alternative C as having an overlap with 4FRI activities, see Figure 8.

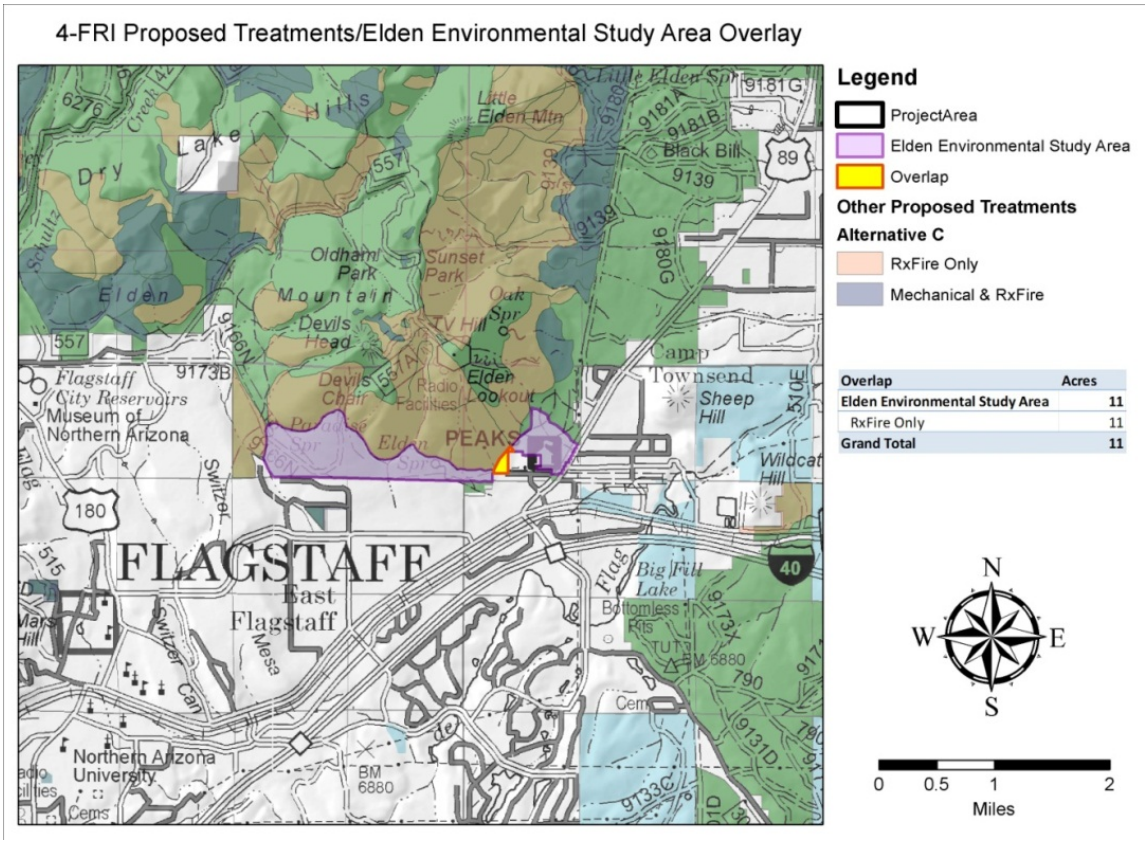

Figure 8 Proposed 4FRI treatments overlap with Elden Environmental Study Area.

The CNF revised forest plan identifies Environmental Study Areas (ESAs) as locations on the forest that are set aside from development for the purpose of environmental education. Mount Elden ESA is located at the base of Mount Elden, adjacent to the subdivisions of Shadow Mountain, Paradise Hills, Skyline Estates, and Swiss Manor and adjacent to Buffalo Park.

Desired conditions for the Mount Elden ESA include providing trails for popular hikes that are convenient and easy to use and environmental education opportunities for the general public as well as school groups. The area is available for study, and recreation and is integral part of the Flagstaff Public School curriculum. There are many formal access points developed along the edge of subdivisions providing public access. This ESA strengthens the opportunities for partnerships between the school, the Forest Service, and the Arizona Game and Fish Department. A wintering deer herd provides an opportunity for wildlife viewing by the students (Forest Service 2012).

There are no standards or guidelines that conflict with the 11 acres of prescribed fire proposed in Alternative C. There may be interpretive opportunities in conjunction with the fire treatment that could be incorporated into environmental education. There could be short term negative effects from prescribed fire due to smoke in adjacent neighborhoods. Effects from smoke have been analyzed in the Fire section of the EIS and fire specialist report, as well as the Recreation and Scenery sections, and specialist reports.

Area 3: The Kaibab National Forest Revised Plan adds the Bill Williams Mountain Management Area. There are 22 acres of treatment proposed in Alternative C that overlap the management area in scattered locations as shown in Figure 9.

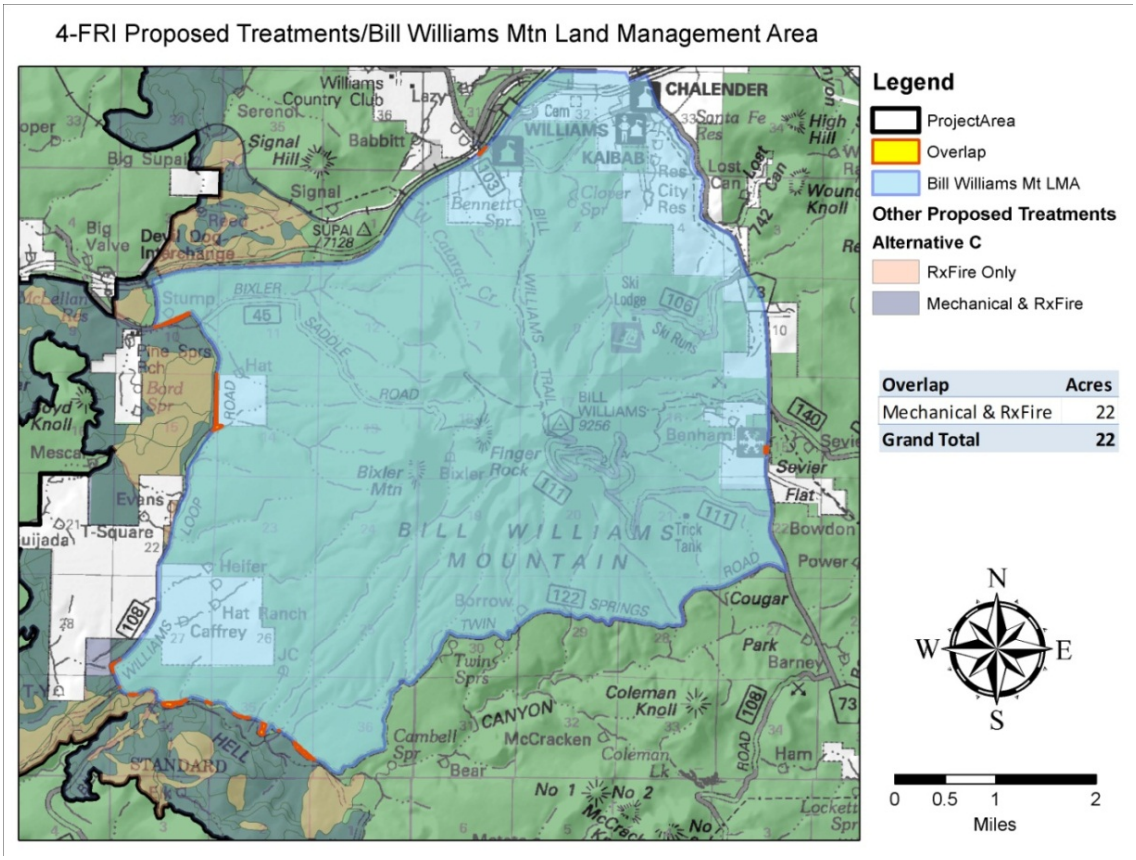

Figure 9 Proposed overlap in treatments at Bill Williams Mountain Management Area.

The proposed mechanical and prescribed fire treatments are compatible with the desired conditions for this Management Area that risk is low for substantial damage to the municipal water supply, infrastructure, water quality, visual quality, and cultural integrity (Forest Service 2012). It is in line with standards and guidelines, and the objective to implement a project to improve the health and sustainability of forest conditions on and surrounding Bill Williams Mountain within five years (Forest Service 2012). Potential effects of mechanical and prescribed fire treatments on recreation and scenery can be found in these sections of the 4FRI EIS as well as associated specialist reports. See the 4FRI EIS for effects to other resources.

Area 4: The revised Kaibab NF forest plan shows potential overlap with developed recreation sites as shown in Figure 10.

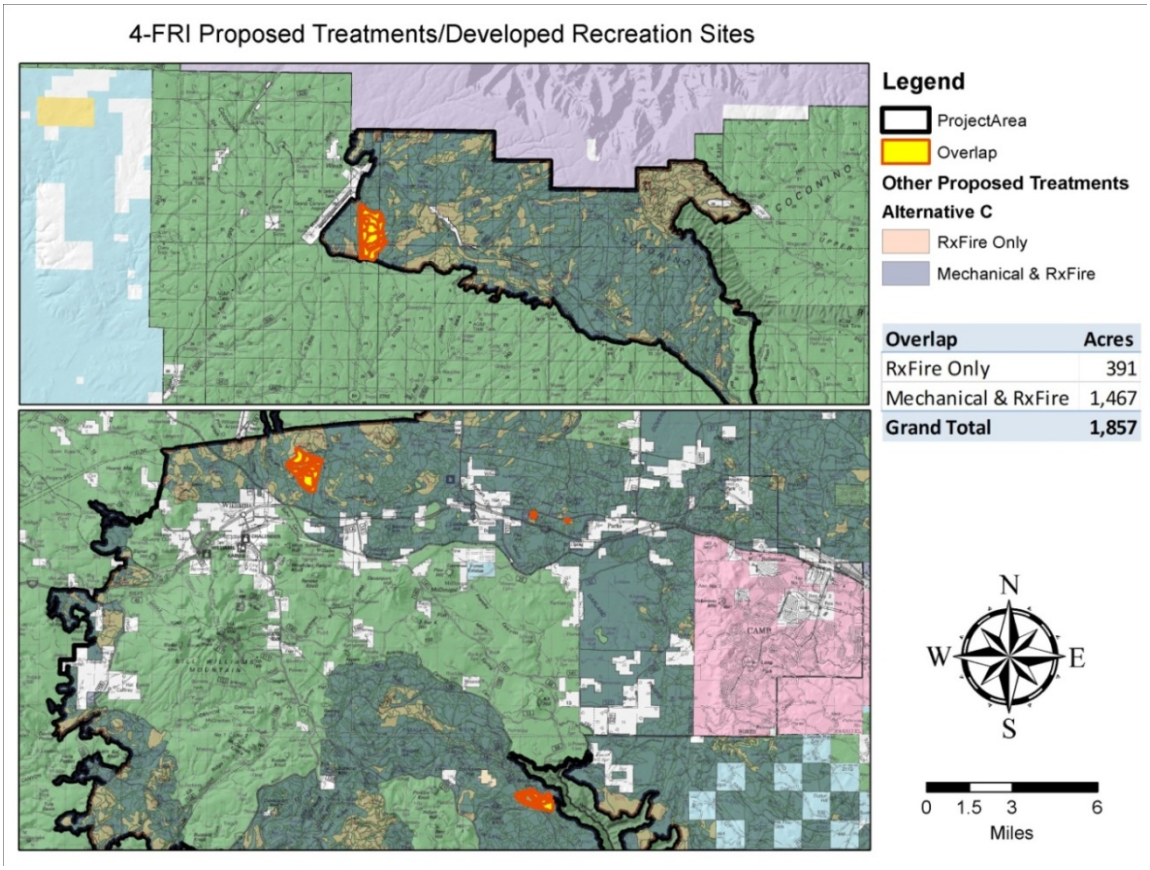

Figure 10 Proposed 4FRI treatments that overlap with developed recreation sites.

Prescribed fire or mechanical treatments and prescribed fire are proposed in Alternative C at Ten-X Campground on Tusayan Ranger District, Kaibab Lake and White Horse Lake Campgrounds, Oakhill Snowplay Area and Garland Prairie Vista on the Williams Ranger District.

Ten-X Campground has had some thinning and prescribed burning treatments in the past. Similarly Kaibab Lake and White Horse Lake Campgrounds have been thinned, but have not received prescribed fire treatment. The guidelines for campgrounds in the KNF revised forest plan (2012) states, “Developed recreation site vegetation management plans should guide tree removal and burning activities in the campgrounds”. Thinning and burning treatments at campgrounds differs from other forest areas. Such treatments may have the overall objective of reducing tree density since a forested setting and healthy forest is desired, but requires more refined treatment. It is desirable to provide and retain privacy and screening among campsites, screen other constructed features such as restrooms, provide shade, retain unique character trees and so on. Per the mitigations for recreation campgrounds, these areas will be treated, but require coordination with the District Recreation Staff in order to determine places where no treatment will occur in order to protect constructed features. In addition, treatment timing and slash pile locations will be agreed upon. Immediate adjacent to the campgrounds (outside of fenced campground boundaries), prescribed burning or mechanical treatments and burning would be appropriate.

At Oakhill Snowplay Area and Garland Prairie Vista, it is appropriate to include burning or mechanical treatments and burning outside of an established boundary that will protect the

constructed features at these sites. Per the mitigations for recreation, these boundaries will be established in conjunction with the District Recreation Staff prior to treatment.

Effects of treatments in campgrounds, outside of campgrounds and outside of the identified boundary at Oakhill Snowplay Area and Garland Prairie Vista would be similar to those analyzed for provision of recreation opportunities in the recreation and scenery sections of the 4FRI EIS and this and the Scenery specialist reports.

Area 5: 4FRI treatments are proposed on eight acres of potential wilderness identified in the revised KNF forest plan (2014). Figure 11 shows the location of the overlapping areas.

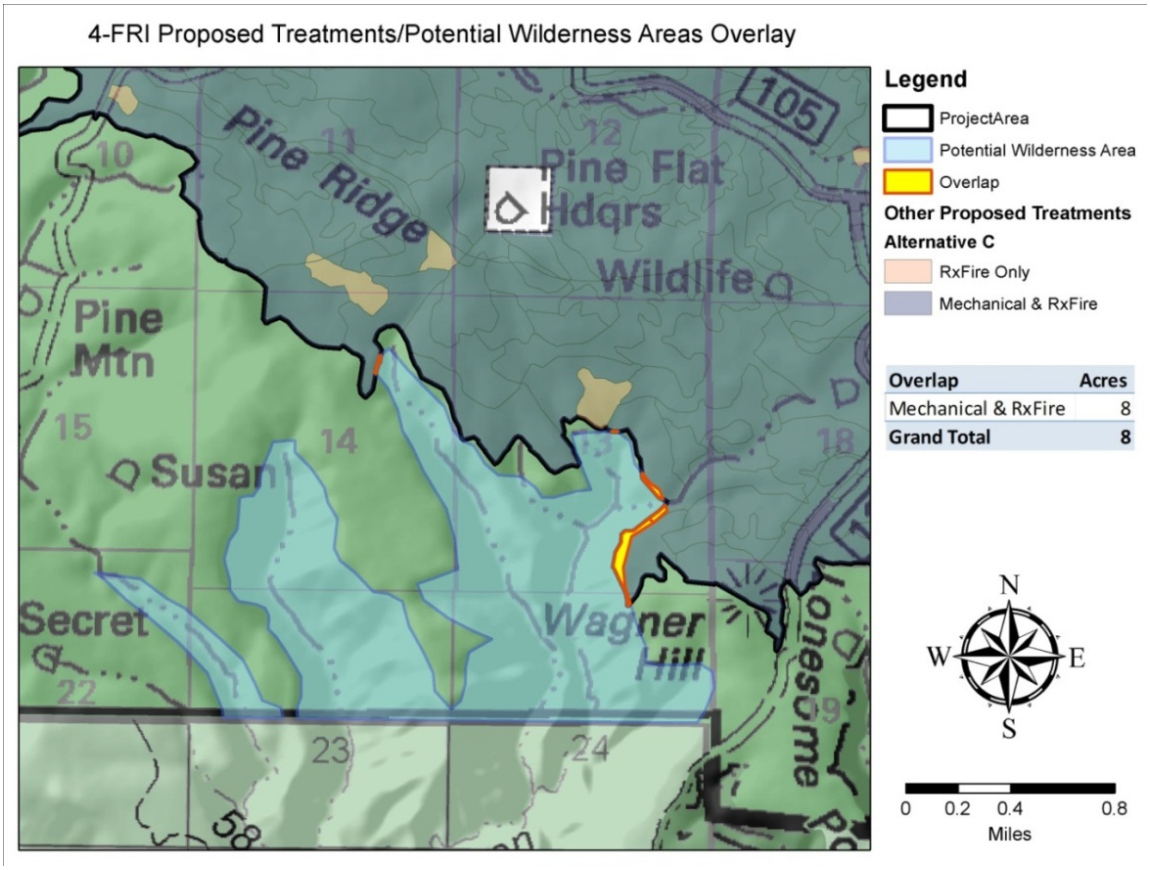

Figure 11 Proposed 4FRI treatments that overlap KNF potential wilderness.

The management approach in the revised KNF forest plan (2014) states that "*Recommended wilderness on the KNF is intended to be managed consistent with the intent of the 1964 Wilderness Act, specifically with a focus on maintaining or achieving wilderness values.*

Although all of these areas have been managed as semi-primitive, non-motorized areas in the past, they have not been managed as wilderness. Some contain evidence of human activities such as old roadbeds, stumps from timber sales, and livestock management structures.

Management may be needed including restoration, trail maintenance, and road obliteration to achieve or retain the desired wilderness values. Because recommended wilderness is not designated wilderness, use of motorized or mechanized equipment may be appropriate when it is

used to move the areas toward the desired natural appearing primitive settings."

The eight acres identified would fit within the management needs identified, specifically restoration. Effects would be similar to those analyzed in the 4FRI EIS for vegetation and fire (as well as associated specialist reports) as well as in the recreation and scenery sections of the EIS and this and the Scenery specialist reports.

Area 6: There are approximately 251 acres of proposed 4FRI treatments that are located within the August 2014 Draft Coconino NF Land and Resource Plan preferred alternative recommended wildernesses. After review of scoping comments on the draft revised forest plan, and update of the recommended wildernesses, Abineau would be added to the preferred alternative for the revised forest plan. Figure 12 shows the area overlap between 4FRI Alternative C and the Draft Coconino NF Land and Resource Plan modified alternative B.

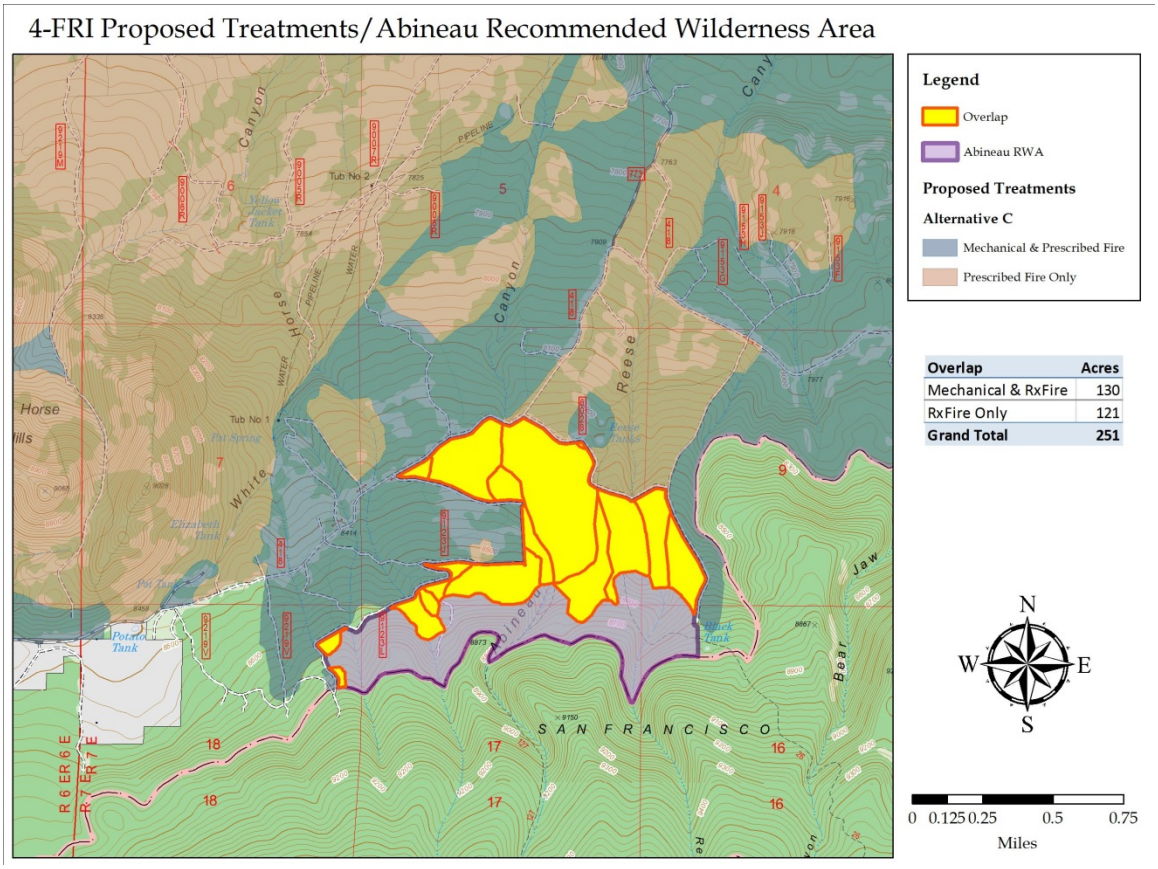

Figure 12. Proposed 4FRI treatments that overlap draft CNF revised forest plan recommended wilderness.

If Draft Coconino NF Land and Resource Plan modified alternative B were selected, no proposed 4FRI treatments would occur within the Abineau recommended wilderness. If another forest plan revision action alternative were chosen that included additional recommended wilderness, any conflicts between the forest plan decision and the 4FRI project would be resolved. 4FRI acres proposed for treatment within recommended wilderness would be removed from the project.

Area 7: There are 60,247 acres of proposed 4FRI treatments that overlap with the Wildland Urban Interface (WUI) Management Area of the Kaibab NF. WUI is generally considered to be the wildland area surrounding resident populations and other human developments having special significance, that are at imminent risk from wildfire. For the Kaibab NF forest plan revision (2012), the forest has refined WUI to a buffer around WUI values to focus more intensive treatments where they will have the most impact for fire protection, and includes the following lands:

- Half-mile buffer around all private lands.
- Half-mile buffer around administrative sites, fee use cabins, fire lookouts, developed campgrounds, day use picnic areas, and facilities managed under special use permits.
- Half-mile buffer around at-risk communication sites.
-

Figure 13 shows the Kaibab NF Wildland Urban Interface Management Area boundary. Per the revised Kaibab NF forest plan (2012) the management approach is: "*A half-mile buffer around human developments is the starting point for determining where more open, intensive treatments occur. This distance is recommended in the HFRA (2003) and provides a distance conducive for passive crown fire to transition to surface fire. During project-specific planning, the area where more intensive treatments are needed may call for adjustment.*"

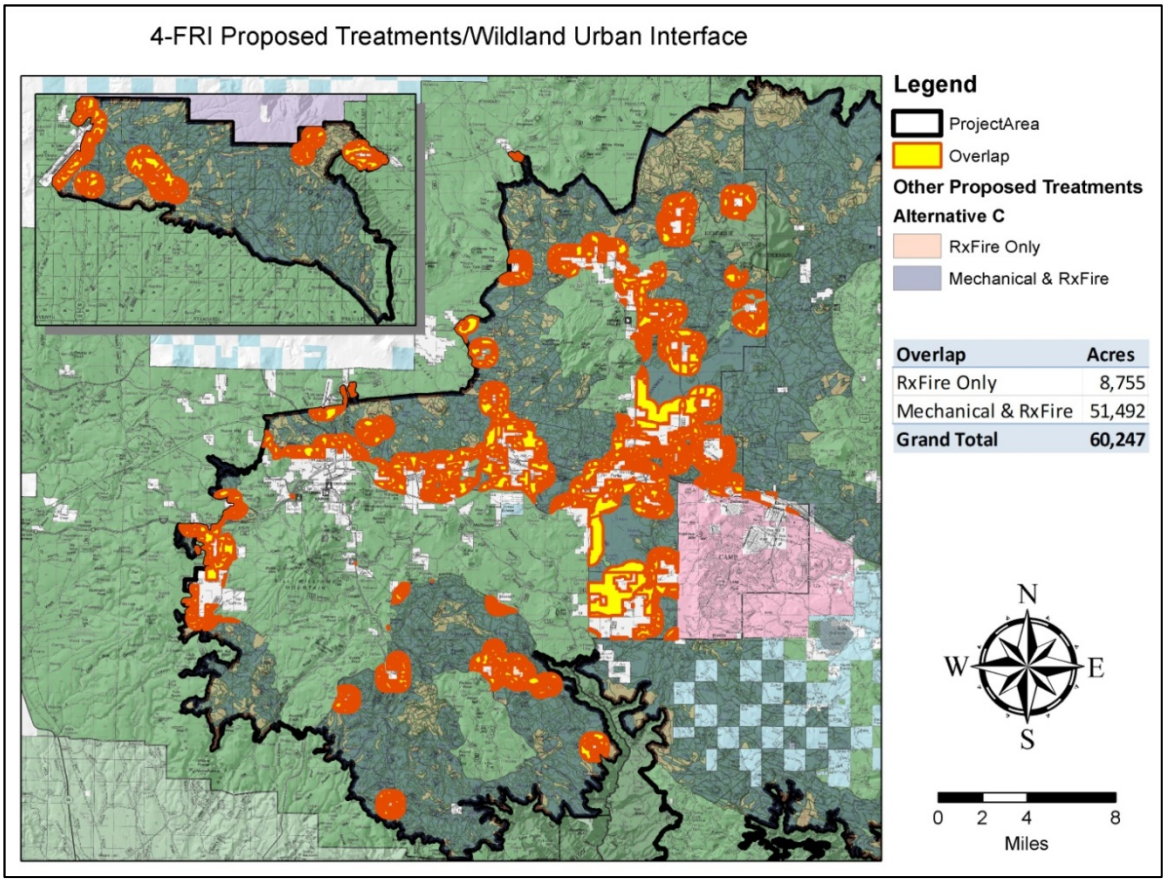

Figure 12 Proposed 4FRI Treatment overlap with KNF Wildland Urban Interface MA

The 60,247 acres of proposed 4FRI treatment are compatible with the management approach in the revised Kaibab NF forest plan (2014). The effects of these treatments are found in the 4FRI EIS and specialist reports.

Cumulative Effects

Cumulative effects of Alternative C are the same as Alternative B. The other projects such as construction of weirs and weather stations would result in no or very small, localized cumulative effects.

Alternative D

Demographics and Public Lands
Arizona's population was one of the fastest growing in the United States from 2000 to 2010. It grew 24.6% during this time period (http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf). Following the overall economic decline in the last few years, this rate had declined to less than one percent per year. With the slow recovery of Arizona's economy, population growth may also being to increase more rapidly (University of Arizona 2012). As Arizona's population grows, demand for recreation grows (Arizona State Parks 2008). Rapid development and infill of limited private land places more pressure on public land agencies to provide open space and recreation opportunities.

This alternative would cause short term and temporary decreases in provision of recreation opportunities on the Coconino and Kaibab NF. Forest users would be dissatisfied with their lack of access to portions of the project area during management activities. Indirect effects would include recreation user displacement, increased use of special areas and designated Wilderness, and potential crowding in areas not receiving forest management treatments.

Campground users at Kaibab Lake and White Horse Lake campground, as well as at Oakhill Snowplay Area and Garland Prairie recreation sites on the Kaibab NF would experience short term disruptions in recreation settings and scenic quality. There could be evidence of mechanical treatment including stumps, skid trails, slash pile and log decks from mechanical treatments, as well as blackened circle from burning slash piles and/or chipped or masticated slash. Timing of treatments would largely avoid high use seasons.

For the action alternatives, this has the most risk of damage due to lightning or human caused fire starts since only about a quarter of the area will receive prescribed fire treatments. Studies have shown that hikers' demand decreased slightly in areas recovering from crown fire and increased in areas recovering from prescribed fire (Hesseln et al 2004)

The completion of restoration activities would provide some protection of 384,966 acres across both national forests from mechanical thinning, but less than Alternatives B or C. Prescribed burning would be much decreased, occurring on only 178,441 acres or about 30% of the project area. The proposed Alternative D activities would help to assure some provision of recreation opportunities, but these would be limited since prescribed fire would not be used to help maintain forest health and resilience.

Recreation Experience
Direct effects of vegetation management are the same as for Alternatives B and C.

Recreationists and campers may be concerned about the scenic quality of the recreation settings since there may be slash piles, residual slash, skid trails and log landings evident as treatments are implemented. Mitigation measures such as piling slash and rehabilitating skid trails will help make the slash from mechanical treatment look orderly and will help skid trails rehabilitate sooner. On both forests, log decks will typically be rehabilitated, although there are opportunities for some log decks to be used for camping along designated camping corridors on the Coconino NF that are at low risk for erosion.

Direct effects of pile burning, prescribed burning and fire line preparation have the least potential for short term displacement of recreationists during implementation since much less area will be treated through these methods. This alternative would result in the fewest days of smoky conditions due to pile burning or prescribed fire. Fire line preparation would occur on about one-quarter of the area, the least of the action alternatives. There could still be some illegal use of the fire lines by motorized vehicles during implementation. Mitigation measures will close off fire line access points from roads and trails and slash, rocks and pine needles will be used to disguise the first visible portion after implementation is complete.

Prescribed burning would occur on about one-third of the project area. The immediate effects following prescribed burning include blackened ground, dead seedlings, scorched bark and needles, and some burned trees. The majority of these effects will persist for about a year until red needles fall, vegetation recovers and black fades. Burned trees will be evident for a longer period of time and create contrast with nearby green vegetation. Although some visitors may prefer to not see any signs of fire in the forest, or recreate in recently burned areas, the effects of low and some moderate intensity fires are beginning to be accepted by the public as an integral part of a healthy forest landscape (Toman et al. 2011).

Much of activity slash would be disposed of by chipping, shredding, mastication, and removal of biomass off-site. Recreationists can expect short term effects from these activities in localized areas where active management is occurring. These effects include loud noise, dust and fumes associated with mechanical chipping, shredding, and/or mastication. There will also be increased dust and road traffic from hauling the biomass off-site (this is in addition to log trucks).

Roads

The effects of roads on recreation resources will be the same as Alternatives B and C.

Dispersed Recreation Activities

Dispersed Camping: There are approximately 357 miles of dispersed camping corridors along the designated road system on the Coconino NF portion of the project where restoration activities will take place. This represents about 61% of designated camping corridors on the Coconino NF. About 4.2 percent of visitors to the Coconino report that they dispersed camp in undeveloped areas. The direct effects of Alternative D would be similar or slightly greater than Alternatives B or C since processing slash whether by chipping/shredding/mastication and or hauling would take longer to complete than cutting and burning, and the machinery used to process slash will result in longer reduction of natural quiet. Winter (2002) found greater support through average approval ratings was found for signs at recreation sites, seasonal closures, restrictions on use, and controlled burns; less support was indicated for mechanical interventions.

Initial ground recovery may be faster with slash removal and less prescribed fire, but the potential for crown fire or high severity ground fire is reduced on only a third of the treatment acres. There

would still be some camper displacement along some of the designated camping corridors during implementation when there are temporary closures.

Indirect effects of mechanical treatments could result in some crowding in designated camping corridors outside of the 4FRI project area. Road signing and use of temporary administrative closures will alert users to management activities. Mitigations to provide visitor information about the location of restoration activities as well as places where there are no activities planned may help reduce visitor frustration about finding a camping location and assist campers in making choices about where they will engage in camping activities.

The Kaibab NF provides short road segments for recreation access including dispersed camping. Less than half of the short road segments would be affected by restoration activities. Approximately 9.2% of recreationists indicated that they dispersed camp in undeveloped areas. Effect would be similar to those on the Coconino NF with mechanical treatment only areas having slash treated with mechanical methods or removal. Initial recovery would be faster than those areas receiving prescribed fire, but the risk of fire starts would be greater with this alternative.

Over half of Kaibab forest users and almost three-quarters of Coconino users report that they walk or hike on the national forests. Fewer indicate that they engage in winter activities, although most local residents witness the popularity of snowplay from Phoenix metro area visitors.

Winter Snowplay: Effects are minimal.

Trails: Hikers and motorized users using the developed trail system may be temporarily displaced or have to change plans if trails or portions of trails are temporarily closed for restoration activities. There may be longer temporary closures with Alternative D since slash would be mechanically treated: chipped/shredded/masticated or transported away from the site. There would be shorter temporary closures associated with prescribed fire activities since only a third of the treatment area would be burned.

Alternative D proposes slightly less mechanical and about one-third as much prescribed fire than Alternatives B and C. Table 18 (in effects analysis for alternative B) indicates treatments proposed in this alternative.

Arizona Trail

Hikers on the Arizona National Scenic Trail may encounter more days of trail closure and reroutes with Alternative D because mechanical slash treatments or hauling slash will take longer than burning. There would be similar effects to trailside settings from mechanical treatments, but less evidence of fire-related effects. Much of the trail would still be at risk for trail damage and high severity fire since less of the project area would be treated with prescribed fire. Trailside vegetation would initially show a response due to mechanical thinning, but long term understory vigor would likely not be as great as where there are mechanical and prescribed fire treatments (Noble 2014).

There would be short term and temporary changes in ROS classes as well as decreases in the scenic quality of trailside recreation settings due to restoration activities. These could include visible skid trails, and log landings on nearby roads, increased noise from mechanical thinning and slash treatment or removal. Following completion of treatments, trailside settings are

expected to naturalize quickly (within 1-3 years) and the scenic quality of the settings would be improved. Understory vegetation would respond, but not as much as Alternatives B or C. The potential for trail damage due to fire is highest with this action alternative.

Hunters and anglers: Effects are the same as for Alternatives B and C.

Fuelwood gathering: Effects are the same as for Alternatives B and C.

Recreation Opportunity Spectrum Classes

Direct and indirect effects to recreation settings of mechanical treatments would be a short-term, temporary change in ROS setting quality until the effects of logging and slash treatment activities fade and become vegetated and the treated area recovers to an "unaltered" or "undisturbed" natural appearance. Mitigation measures have been designed to ensure that direct effects of project activities are short-term, and important recreation values are protected in the long-term.

This alternative does less than Alternatives B or C to provide for the long-term protection of recreational settings and facilities on the project area since total prescribed fire is reduced to 178,441 acres of prescribed burning. Stand conditions will be improved from thinning, but fuels loading would be reduced on only about a third of the project area. The risk of high severity fire would be the greatest of all action alternatives, but less than the no action alternative. This alternative have the least positive effects of the action alternatives in moving toward desired conditions and protecting and maintaining high quality recreation settings into the future.

Slash resulting from mechanical treatments would be disposed of through various methods including chipping, shredding, mastication, and removal of biomass off-site. These methods would best protect the scenic quality and natural appearing quality of ROS classes and recreation settings of all alternatives. However these slash treatment methods also contribute to already high fuels loadings, and would increase the risk of high severity wildfire occurring.

There would be no change or improvement in ROS classes from decommissioning designated forest system roads or unauthorized routes and no improvement in recreation settings over time due to naturalization of these linear routes. Spring and channel restoration will improve recreation settings over time. Aspen treatments will take longer for recreation settings to be natural appearing in roaded natural and semi-primitive settings due to the need to fence or create barriers to ungulate grazing. In the long term aspen will meet the ROS class characteristics.

This alternative will provide for restoration treatments along both utility corridors and road rights-of-ways. Mitigation measures to feather abrupt edges of corridors and rights-of-way should provide improve the ROS class compliance. Treatment strategies to feather edges and create better transitions between the forest and clearing will make these linear features somewhat more natural appearing and would improve the scenic quality of recreation settings that are adjacent to or cross these features.

The understory is expected to be improved if Alternative D were implemented as shown in Table 1-19, but not as much as Alternatives B and C. Based on understory responses to overstory treatments (Noble 2014), the mechanical treatments opens the canopy and allows improvement of understory characteristics, but thinning and burning provide the most increase in understory characteristics with the possible exceptions of shrubs and Gambel oak. About one-quarter of the

area proposed for restoration would have well improved recreation settings, the remainder would have somewhat improved recreation settings.

Spring and channel restoration activities will improve the resilience of these areas and make them more attractive to dispersed recreationists. Water in the Southwest is a rare feature, and people are attracted to it for recreation activities including hiking, picnicking, camping, scenery, wildlife and wildflower viewing. The proposed improvements may cause short term changes in the recreation settings, but would result in improvements in the setting characteristics over time.

Aspen groves are popular recreation settings for many users throughout the year, but especially for fall color viewing. The restoration activities will assure that aspen continue as a vital component within the ponderosa pine forest. There would be short to moderate term changes in ROS settings where aspen are treated. Aspen restoration requires that ungulates be kept out of sprouting trees until they are large enough to withstand the browsing pressure. Fencing and jackstraw piling are both proposed methods for keeping the ungulates out. If fencing and jackstrawing is used in semi-primitive settings, it will cause changes in the ROS class setting characteristics since the natural appearing environment would be somewhat altered. Since the barriers must stay in place for many years, the primitive ROS settings would be altered for about 20 years or until the trees can survive browsing.

Will project activities affect provision of a variety of recreation opportunities? (Measure: acres of opportunities affected)

Alternative D would result in some reduction of recreation opportunities during active forest thinning and prescribed burning, and potentially longer slash treatment duration than Alternatives B or C. It is estimated that up to one-tenth of the project area or about 40,000 acres could be affected at one time. Areas may be closed to the public due to hazardous conditions which would result in forest user displacement and user dissatisfaction. There could also be an increase in crowding in nearby open forest areas.

Will project activities result in substantial interference with the nature and purposes of the Arizona National Scenic Trail or adverse impacts to the Trail corridor?

Table 19 (in effects analysis for alternative B) indicates the proposed treatments and number of treatments that would occur along the Arizona National Scenic Trail from alternatives B, C, and D. There may be more days of trail closure or reroute with Alternative D because mechanical slash treatments or hauling slash will take longer than burning. Trailside effects would be similar to Alternatives B and C, but less evidence of fire-related effects. Much of the trail would still be at risk for trail damage and high severity fire since less of the project area would be treated with prescribed fire. Trailside vegetation would initially show a response due to mechanical thinning, but long term understory vigor would likely not be as great as where there are mechanical and prescribed fire treatments (Noble 2014).

The health and sustainability of the ponderosa pine landscape within the project area and in which the Arizona Trail is located is at substantial risk from large scale, high severity fire. This project would meet both the requirements of 16 USC 1246 to “harmonize and complement multiple uses”, as well as “conservation and enjoyment of significant scenic, historic, natural and cultural qualities of the area”. The proposed restoration treatments (mechanical and prescribed fire) comply with forest plan direction for both the Coconino and Kaibab NF. Mitigations or Design Criteria have been developed that would help to protect the trail tread and trailside scenery. The

activities proposed in Alternative D will not result in substantial interference or adverse impacts to the Arizona Trail. There would be short term disruptions to segments of the trail, and some users would be disappointed or dissatisfied with trail reroutes or temporary closures. In the long term, the health and vigor of trailside vegetation would be improved, views expanded, and risks from disturbances (fire, insects and diseases) to the trail would be reduced, but not as much as with Alternatives B or C.

Will smoke from pile burning and prescribed burning affect provision of recreation opportunities? (Measure: describe and compare potential effects)

Smoke from pile burning would be the least of the action alternatives with Alternative D. Prescribed burning would occur on about a third of the acreage as Alternatives B or C. There would still be short term effects where widespread smoke from a particular burn block may be present for several days. In some isolated places there could also be lingering smoke from burning stumps or roots for several weeks. Effects could include user dissatisfaction, user displacement and short term reduction in setting qualities due to smoke obscuring the surrounding visual quality. Private landowners and communities may experience reduced visibility and smoky conditions when conditions are appropriate for burning. Mitigations such as timing for adequate ventilation, coordination with other agencies, avoiding high use holidays, and provision of visitor information will reduce these effects or provide needed information so that individuals can make choices about their recreation activities.

Will the proposed restoration activities diverge from reference conditions identified for the forest and in the mapped Recreation Opportunity Spectrum settings? (Measure: acres meeting ROS settings)

This alternative provides for the long-term protection of recreational settings and facilities on 384,966 acres where mechanical thinning would occur, improving stand conditions, and would reduce the fuel loads on 178,441 acres where prescribed burning will occur. The risk of high severity wildfire will be lessened in the short term, but lack of prescribed fire and repeat burning will result in increasing risk of wildfire over time.

Will proposed activities such as temporary road construction or other management activities create inconsistencies in the ROS classes? (Measure: miles of roads or acres of treatment)

Restoration activities will use the designated forest road system for access to mechanically treat vegetation and conduct pile burning and prescribed fire activities as described for Alternatives B and C. The quality of scenery viewing will be reduced in the short term (1-3 years) during project implementation due to logging operations, but because slash will be treated or removed rather than being piled or burned, these effects will be shortened and reduced. Prescribed fires will occur on about 178,441 acre with short term effects. The areas will begin to recover and naturalize. Design criteria include providing information about scheduled burns will be available so that recreation visitors can make informed decisions about choosing the places they recreate.

The effects of spring improvements, ephemeral channel improvements, and fencing would be the same as with Alternatives B and C. Effects of utility corridor and road rights-of-ways would also be the same.

Understory vegetation is would not be improved as much with Alternative D as with Alternatives B and C. Based on information compiled for this project (Noble 2014), the mechanical treatments improve all understory characteristics, but thinning and burning increase most understory

characteristics with the possible exceptions of shrubs and Gambel oak. Since there is about a third as much prescribed burning included in this alternative, it would not result in as health and varied an understory as the other action alternatives.

Forest Plan Amendments

Three non-significant forest plan amendments (see FEIS Appendix B) would be required on the Coconino NF to implement alternative D:

Amendment 1 would add language to allow mechanical treatments up to 16-inch d.b.h. to improve habitat structure (nesting and roosting habitat) in 18 MSO PACs. These PACs would be managed for a minimum basal area of 110. The amendment would remove language that limits PAC treatments in the recovery unit to 10 percent increments and language that requires the selection of an equal number of untreated PACs as controls. The amendment would remove language referencing monitoring (pre- and post-treatment, population, and habitat). Replacement language would defer final project design and monitoring to the FWS biological opinion specific to MSO for the project.

The amendment, which is specific to restricted habitat in pine-oak, would add definitions of target and threshold habitat

The effects of this forest plan amendment would be the same as with Alternative B.

Amendment 2 would add the desired percentage of interspace within uneven-aged stands to facilitate restoration in goshawk habitat (excluding nest areas), add the interspace distance between tree groups, add language clarifying where canopy cover is and is not measured, allow 28,952 acres to be managed for an open reference condition, and add a definition to the forest plan glossary for the terms interspaces, open reference condition, and stands.

The effects to recreation from this plan amendment would be the same as Alternatives B and C.

Amendment 3 would remove the cultural resource standard that requires achieving a “no effect” determination and would add the words “or no adverse effect” to the remaining standard. In effect, management would strive to achieve a “no effect” or “no adverse effect” determination.

The amendment would have no effect on recreation resources.

Cumulative Effects

The cumulative effects area for Alternative D is the ponderosa pine forests on the Coconino and Kaibab NF, and the cumulative effects period would be 20-30 years.

Past human activities and natural disturbance processes have influenced the current condition of the project area. Management activities and natural processes that have affected, or continue to affect, vegetation structure, spatial arrangement and pattern, composition and diversity, natural processes (such as fire), and movement towards increased forest resiliency and function. Table 26 provides an overall assessment of positive and negative cumulative effects of past, present and future projects on recreation.

Table 26 Comparison of relative cumulative effects to recreation for Alternatives D.

Activity	Relative Contribution to Cumulative Effects to Recreation							
	Positive Effects/Trend				Negative Effects/Trend			
	I/S	Low	Moderate	High	I/S	Low	Moderate	High
Past Vegetation Management		X						X
Present/Future Vegetation Management				X		X		
Past Fire		X						X
Present/Future Fire			X				X	
Utility Corridor/Site Clearing						X		
Motorized Travel Management				X		X		
Road or Trail Construction		X					X	

The cumulative effects of Alternative D and past, present and future projects would be similar to those of Alternatives B and C with the following exceptions.

Alternative D would thin approximately 384,966 acres of the ponderosa pine forest and prescribed burn only 178,441 acres. These actions would reduce the risk of high severity crown fire and large insect outbreaks in the short term. About 1/3 as much area would receive prescribed burning. Fuel loads would continue to be high in 2/3 of the area. Alternative D would result in the forest being more susceptible to wildfire than Alternatives B or C. The effects of this Alternative and other projects would result in a declining quality of recreation opportunities while at the same time, the desire for recreation use is increasing as a result of population growth and the public is increasingly dependent on national forests for recreation and leisure activities. Thus, this alternative would result in a cumulative decrease in the ability of the Coconino and Kaibab National Forests to meet recreation demands over the long term, although not as much as the No Action alternative.

Past vegetation management activities resulted in an even-aged forest structure that is generally undesirable for recreation settings. It contributed to the scarcity of large, mature trees, and has not resulted in a forest with a more open structure, two setting characteristics (Ryan 2005) that have been identified as desirable to forest users. Past fire suppression activities have contributed to overstocked forest conditions, increased fuels, and decreased understory vegetation health. The current and planned vegetation management treatments and burning projects on both forests, as well as opportunities for managed wildfire result in cumulative improvements in forest health and sustainability in the ponderosa pine, but these are limited in scope, and would have less of a cumulative effect in ponderosa pine forest types on the Coconino and Kaibab since the quantity of prescribed burning under this alternative is greatly reduced. This results in more localized benefits to the recreation settings in the ponderosa pine forest on the Coconino and Kaibab and less of a cumulative benefit toward maintaining resilient ponderosa pine forest types to provide recreational opportunities. In the event of a wildfire, there is a greater chance of high severity ground fire as a result of high fuels loadings. Since wildfire risks are only reduced a third as much in Alternative D, the desired recreation settings, and ROS class characteristics forest users seek would be altered and the cumulative effects would result in a lack of desired recreation settings and long term changes in ROS classes.

This alternative would likely require additional mechanical means to chip or haul activity slash

resulting from thinning activities. This would likely result in temporary restrictions to parts of the forest that may combine with motor vehicle restrictions included in the new travel management rules to restrict vehicle access to larger parts of the Forest, thus temporarily decreasing recreation opportunities, but not necessarily recreational quality. These cumulative impacts on recreational opportunities are expected to be localized to where the treatment work is taking place and would be limited to weeks or months in time.

Desired recreation setting characteristics such as large, mature trees, healthy understory and diversity of tree age classes, sizes, and species are also at high risk from the effects of climate change. While drought cycles are common in the Southwest, increasing temperatures and decreases in precipitation in combination with overstocked forest conditions and high fuel loads are predicted to result in an increase in high severity wildfires (Westerling et al 2006, Marlon et al 2012, CLIMAS 2011). Unmanaged forests have shown increases in tree stress and mortality as a result of global warming, and old, mature trees are especially vulnerable (Ritchie 2008, VanMantgem et al 2009, Williams et al 2010). Alternative D and other vegetation management projects would cumulatively result in improved forest structure, but less improvement in forest composition and diversity. The forest resilience would be improved in the short term, but risk of wildfire would still be high and with it the potential for large scale fires that could kill many trees, including vulnerable old, mature trees.

Alternative E

The effects described in Alternative E would be the same for Alternative B with the exception of that approximately 6% more acres would receive mechanical and prescribed fire restoration treatments, but 10% less are would receive prescribed fire-only treatment. This alternative would treat slash using chipping, shredding, mastication and removal of biomass off-site similar to Alternative D and the effects would be similar to that portion of Alternative D. MSO PAC core areas would be mechanically treated to 9-inch dbh resulting less age class diversity and fewer trees being removed. No acres would be managed for open reference condition. Watershed research would occur. No plan amendments would be required. There would be no effect to recreation from treating 38,260 acres less intensively.

Restoration acres would be greater than Alternative B, but less than Alternative C. There would be a less positive effect on protecting and maintaining high quality recreation settings over time. It would have a more positive effect than Alternative B on protecting and maintaining high quality recreation settings over time. Alternative E would result in 1% less temporary changes in ROS classes during project implementation than Alternative C. Assuming a linear relationship, up to one percent fewer forest users would be affected by the slightly reduced amount of treatments.

Recreation Experience

Direct effects of vegetation management are the same as for Alternatives B, C and D.

Recreationists and campers may be concerned about the scenic quality of the recreation settings since there may be slash piles, residual slash, skid trails and log landings evident as treatments are implemented. Mitigation measures such as piling slash and rehabilitating skid trails will help make the slash from mechanical treatment look orderly and will help skid trails rehabilitate sooner. On both forests, log decks will typically be rehabilitated, although there are opportunities

for some log decks to be used for camping along designated camping corridors on the Coconino NF that are at low risk for erosion.

Direct effects of prescribed burning and fire line preparation have similar effects as Alternatives B and C. There could still be some illegal use of the fire lines by motorized vehicles during implementation. Mitigation measures will close off fire line access points from roads and trails and slash, rocks and pine needles will be used to disguise the first visible portion after implementation is complete.

The immediate effects following prescribed burning include blackened ground, dead seedlings, scorched bark and needles, and some burned trees. The majority of these effects will persist for about a year until red needles fall, vegetation recovers and black fades. Burned trees will be evident for a longer period of time and create contrast with nearby green vegetation. Although some visitors may prefer to not see any signs of fire in the forest, or recreate in recently burned areas, the effects of low and some moderate intensity fires are beginning to be accepted by the public as an integral part of a healthy forest landscape (Toman et al. 2011).

Much of activity slash would be disposed of by chipping, shredding, mastication, and removal of biomass off-site. Recreationists can expect short term effects from these activities in localized areas where active management is occurring. These effects include loud noise, dust and fumes associated with mechanical chipping, shredding, and/or mastication. There will also be increased dust and road traffic from hauling the biomass off-site (this is in addition to log trucks operating).

Roads

The effects of roads on recreation resources will be the same as Alternatives B, C and D.

Dispersed Recreation Activities

Dispersed Camping: There are approximately 357 miles of dispersed camping corridors along the designated road system on the Coconino NF portion of the project where restoration activities will take place. This represents about 61% of designated camping corridors on the Coconino NF. About 4.2 percent of visitors to the Coconino report that they dispersed camp in undeveloped areas. The direct effects of Alternative E would be similar to Alternative B. Effects of processing slash whether by chipping/shredding/mastication and or hauling would take longer to complete than cutting and burning, and the machinery used to process slash will result in longer reduction of natural quiet similar to Alternative D. Winter (2002) found greater support through average approval ratings was found for signs at recreation sites, seasonal closures, restrictions on use, and controlled burns; less support was indicated for mechanical interventions.

Indirect effects of mechanical and prescribed burning could result in some crowding in designated camping corridors outside of the 4FRI project area. Road signing and use of temporary administrative closures will alert users to management activities. Mitigations to provide visitor information about the location of restoration activities as well as places where there are no activities planned may help reduce visitor frustration about finding a camping location and assist campers in making choices about where they will engage in camping activities.

The Kaibab NF currently provides short road segments for recreation access including dispersed camping. Less than half of the short road segments would be affected by restoration activities. Approximately 9.2% of recreationists indicated that they dispersed camp in undeveloped areas.

Effect would be similar to those on the Coconino NF with mechanical treatment and prescribed burning, as well as slash treated with mechanical methods or removal.

Over half of Kaibab forest users and almost three-quarters of Coconino users report that they walk or hike on the national forests. Fewer indicate that they engage in winter activities, although most local residents witness the popularity of snowplay from Phoenix metro area visitors.

Winter Snowplay: Effects are minimal.

Trails: Hikers and motorized users using the developed trail system may be temporarily displaced or have to change plans if trails or portions of trails are temporarily closed for restoration activities. Effects would be similar to Alternatives B or C.

Alternative E proposes similar mechanical and prescribed fire as Alternatives B and C. Table 18 (in effects analysis for alternative B) indicates treatments proposed in this alternative.

Arizona Trail

Hikers on the Arizona National Scenic Trail may encounter more days of trail closure and reroutes with Alternative E because mechanical slash treatments or hauling slash will take longer than slash treatment by pile burning. There would be similar effects to trailside settings from mechanical and prescribed fire treatments as with Alternatives B and C. Trailside vegetation would respond and improve due to mechanical thinning and prescribed burning (Noble 2014).

There would be short term and temporary changes in ROS classes as well as decreases in the scenic quality of trailside recreation settings due to restoration activities. These could include visible skid trails, and log landings on nearby roads, increased noise from mechanical thinning, slash treatment or removal and prescribed fire. Following completion of treatments, trailside settings are expected to naturalize quickly (within 1-3 years) and the scenic quality of the settings would be improved. Understory vegetation response would be similar to Alternatives B or C.

Hunters and anglers: Effects are the same as for Alternatives B and C.

Fuelwood gathering: Effects are the same as for Alternatives B and C.

Recreation Opportunity Spectrum Classes

Direct and indirect effects to recreation settings of mechanical treatments would be a short-term, temporary change in ROS setting quality until the effects of logging and slash treatment activities fade and prescribed burning is completed. The treated area would recover to an “unaltered” or “undisturbed” natural appearance. Design criteria have been designed to ensure that direct effects of project activities are short-term, and important recreation values are protected in the long-term.

This alternative is similar to Alternatives B or C in providing for the long-term protection of recreational settings and facilities on the project area. Stand conditions will be improved from thinning and prescribed fire, but not as much as with Alternative C. The risk of high severity fire would be similar to Alternatives B and C. This alternative have the positive result of moving toward desired conditions and protecting and maintaining high quality recreation settings into the future, although not as much as Alternatives C.

There would be improvements in ROS classes from decommissioning designated forest system

roads or unauthorized routes and improvement in recreation settings over time due to naturalization of these linear routes. Spring and channel restoration will improve recreation settings over time. Aspen treatments will take longer for recreation settings to be natural appearing in roaded natural and semi-primitive settings due to the need to fence or create barriers to ungulate grazing. In the long term aspen will meet the ROS class characteristics.

This alternative will provide for restoration treatments along both utility corridors and road rights-of-ways. Design criteria to feather abrupt edges of corridors and rights-of-way should provide improve the ROS class compliance. Treatment strategies to feather edges and create better transitions between the forest and clearing will make these linear features somewhat more natural appearing and would improve the scenic quality of recreation settings that are adjacent to or cross these features.

The understory is expected to be improved if Alternative E were implemented as shown in Table 1-19, but not as much as Alternatives B and C. Based on understory responses to overstory treatments (Noble 2014), the mechanical treatments opens the canopy and allows improvement of understory characteristics, but thinning and burning provide the most increase in understory characteristics with the possible exceptions of shrubs and Gambel oak.

Spring and channel restoration activities will improve the resilience of these areas and make them more attractive to dispersed recreationists. Water in the Southwest is a rare feature, and people are attracted to it for recreation activities including hiking, picnicking, camping, scenery, wildlife and wildflower viewing. The proposed improvements may cause short term changes in the recreation settings, but would result in improvements in the setting characteristics over time.

Research activities will have effects similar to Alternative C.

Aspen groves are popular recreation settings for many users throughout the year, but especially for fall color viewing. The restoration activities will assure that aspen continue as a vital component within the ponderosa pine forest. There would be short to moderate term changes in ROS settings where aspen are treated. Aspen restoration requires that ungulates be kept out of sprouting trees until they are large enough to withstand the browsing pressure. Fencing and jackstraw piling are both proposed methods for keeping the ungulates out. If fencing and jackstrawing is used in semi-primitive settings, it will cause changes in the ROS class setting characteristics since the natural appearing environment would be somewhat altered. Since the barriers must stay in place for many years, the primitive ROS settings would be altered for about 20 years or until the trees can survive browsing.

Will project activities affect provision of a variety of recreation opportunities? (Measure: acres of opportunities affected)

Alternative E would result in some reduction of recreation opportunities during active forest thinning and prescribed burning, and potentially longer slash treatment duration than Alternatives B or C. It is estimated that up to one-tenth of the project area or about 40,000 acres could be affected at one time. Areas may be closed to the public due to hazardous conditions which would result in forest user displacement and user dissatisfaction. There could also be an increase in crowding in nearby open forest areas.

Will project activities result in substantial interference with the nature and purposes of the Arizona National Scenic Trail or adverse impacts to the Trail corridor?

Table 19 (in effects analysis for alternative B) indicates the proposed treatments and number of treatments that would occur along the Arizona National Scenic Trail from alternatives B, C, and D. There may be more days of trail closure or reroute with Alternative E because mechanical slash treatments or hauling slash will take longer than burning. Trailside effects would be similar to Alternatives B and C. Trailside vegetation would respond similarly as described for Alternatives B and C.

The health and sustainability of the ponderosa pine landscape within the project area and in which the Arizona Trail is located is at substantial risk from large scale, high severity fire. This project would meet both the requirements of 16 USC 1246 to "harmonize and complement multiple uses", as well as "conservation and enjoyment of significant scenic, historic, natural and cultural qualities of the area". The proposed restoration treatments (mechanical and prescribed fire) comply with forest plan direction for both the Coconino and Kaibab NF. Mitigations or Design Criteria have been developed that would help to protect the trail tread and trailside scenery. The activities proposed in Alternative E will not result in substantial interference or adverse impacts to the Arizona Trail. There would be short term disruptions to segments of the trail, and some users would be disappointed or dissatisfied with trail reroutes or temporary closures. In the long term, the health and vigor of trailside vegetation would be improved, views expanded, and risks from disturbances (fire, insects and diseases) to the trail would be reduced, but slightly less than with Alternatives C.

Will smoke from pile burning and prescribed burning affect provision of recreation opportunities? (Measure: describe and compare potential effects)

Smoke from pile burning would be slightly less with Alternative E since some slash would be processed and removed for biomass off-site. Prescribed burning would occur on a little less acreage as Alternatives B or C. There would still be short term effects where widespread smoke from a particular burn block may be present for several days. In some isolated places there could also be lingering smoke from burning stumps or roots for several weeks. Effects could include user dissatisfaction, user displacement and short term reduction in setting qualities due to smoke obscuring the surrounding visual quality. Private landowners and communities may experience reduced visibility and smoky conditions when conditions are appropriate for burning. Mitigations such as timing for adequate ventilation, coordination with other agencies, avoiding high use holidays, and provision of visitor information will reduce these effects or provide needed information so that individuals can make choices about their recreation activities.

Will the proposed restoration activities diverge from reference conditions identified for the forest and in the mapped Recreation Opportunity Spectrum settings? (Measure: acres meeting ROS settings)

This alternative provides for the long-term protection of recreational settings and facilities on 581,301 acres where restoration treatments would occur, improving stand conditions, and would reduce the fuel loads on 177,801 acres where prescribed burning-only will occur.

Will proposed activities such as temporary road construction or other management activities create inconsistencies in the ROS classes? (Measure: miles of roads or acres of treatment)

Restoration activities will use the designated forest road system for access to mechanically treat vegetation and conduct pile burning and prescribed fire activities as described for Alternatives B and C. The quality of scenery viewing will be reduced in the short term (1-3 years) during project

implementation due to logging operations, but because slash will be treated or removed rather than being piled and burned, these effects will be shortened and reduced. Prescribed fires will occur on about 581,301 acres with short term effects. The areas will begin to recover and naturalize. Design criteria include providing information about scheduled burns will be available so that recreation visitors can make informed decisions about choosing the places they recreate.

The effects of spring improvements, ephemeral channel improvements, and fencing would be the same as with Alternatives B, C and D. Effects of utility corridor and road rights-of-ways would also be the same.

Understory vegetation is would not be improved as much with Alternatives B or C. Based on information compiled for this project (Noble 2014), the mechanical treatments improve all understory characteristics, but thinning and burning increase most understory characteristics with the possible exceptions of shrubs and Gambel oak. Since there is about a third as much prescribed burning included in this alternative, it would not result in as health and varied an understory as the other action alternatives.

Cumulative Effects

The cumulative effects area for Alternative E is the ponderosa pine forests on the Coconino and Kaibab NF, and the cumulative effects period would be 20-30 years.

Past human activities and natural disturbance processes have influenced the current condition of the project area. Management activities and natural processes that have affected, or continue to affect, vegetation structure, spatial arrangement and pattern, composition and diversity, natural processes (such as fire), and movement towards increased forest resiliency and function. Table 27 provides an overall assessment of positive and negative cumulative effects of past, present and future projects on recreation.

Table 27 Comparison of relative cumulative effects to recreation for Alternatives D.

Activity	Relative Contribution to Cumulative Effects to Recreation							
	Positive Effects/Trend				Negative Effects/Trend			
	I/S	Low	Moderate	High	I/S	Low	Moderate	High
Past Vegetation Management		X						X
Present/Future Vegetation Management			X				X	
Past Fire		X						X
Present/Future Fire			X				X	
Utility Corridor/Site Clearing						X		
Motorized Travel Management				X		X		
Road or Trail Construction		X					X	

The cumulative effects of Alternative E and past, present and future projects would be similar to those of Alternatives B and C. Contrasts to cumulative effects of B and C are listed below.

Past vegetation management activities resulted in an even-aged forest structure that is generally undesirable for recreation settings. It contributed to the scarcity of large, mature trees, and has not resulted in a forest with a more open structure, two setting characteristics (Ryan 2005) that have been identified as desirable to forest users. Past fire suppression activities have contributed to overstocked forest conditions, increased fuels, and decreased understory vegetation health. The current and planned vegetation management treatments and burning projects on both forests, as well as opportunities for managed wildfire result in cumulative improvements in forest health and sustainability in the ponderosa pine. This alternative result in fewer localized benefits to the recreation settings in the ponderosa pine forest on the Coconino and Kaibab and less of a cumulative benefit toward maintaining resilient ponderosa pine forest types to provide recreational opportunities. In the event of a wildfire, there is some chance of high and moderate severity ground fire as a result of high fuels loadings. Since wildfire risks are still a threat due to less clumpy and groupy structure, and lack of tree interspaces, the desired recreation settings, and ROS class characteristics forest users seek would be more limited, and the cumulative effects would result in a lack of desired recreation settings and long term changes in ROS classes.

Desired recreation setting characteristics such as large, mature trees, healthy understory and diversity of tree age classes, sizes, and species are also at high risk from the effects of climate change. While drought cycles are common in the Southwest, increasing temperatures and decreases in precipitation in combination with overstocked forest conditions and high fuel loads are predicted to result in an increase in high severity wildfires (Westerling et al 2006, Marlon et al 2012, CLIMAS 2011). Unmanaged forests have shown increases in tree stress and mortality as a result of global warming, and old, mature trees are especially vulnerable (Ritchie 2008, VanMantgem et al 2009, Williams et al 2010). Alternative E and other vegetation management projects would cumulatively result in somewhat improved forest structure, but less improvement in forest composition and diversity than Alternative C. The forest resilience would be improved in the short term, but risk of wildfire would continue and with it the potential for large scale fires that could kill many trees, including vulnerable old, mature trees.

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