

**ENVIRONMENTAL ASSESSMENT**  
**EAST RIM VEGETATION MANAGEMENT**

*NORTH KAIBAB RANGER DISTRICT*  
*KAIBAB NATIONAL FOREST*  
*COCONINO COUNTY, ARIZONA*

**November 2002**

**Responsible Agency:**  
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## I. PURPOSE AND NEED FOR ACTION

### A. INTRODUCTION

The North Kaibab Ranger District is proposing tree removals and other management activities on the Kaibab Plateau in the East Rim **Planning Area** to move the vegetation resources from their existing condition toward the desired condition. Project activities are planned to take place in 2003 through 2008. This area was previously the East Rim Ecosystem Management Area. Management Situation Report – East Rim Forest Plan Implementation Land Unit (MSR), February 1994, described the existing and desired conditions (Project Record document #17).

This EA incorporates documented analyses by summarization and reference where appropriate.

### B. LOCATION AND MANAGEMENT DIRECTION

The East Rim Planning Area is located approximately 48 miles southeast of Fredonia, Arizona (please refer to the map on the following page). It is characterized by ponderosa pine, **mixed conifer** (composed of white fir, Douglas-fir and ponderosa pine) and spruce/fir forests with mountain meadow grasslands and aspen **stands** common (Definitions of key terms--highlighted in bold print--can be found in the Glossary in Chapter VI.). Major topographic features include Tater Ridge, Upper Tater Canyon, Dog Canyon, Pleasant Valley, the northern seven miles of De Motte Park, and the East Rim Overlook. Elevations vary from 7200 to 8800 feet. The boundaries are: north--northern end of Pleasant Valley and Forest Road 213; east--Saddle Mountain Wilderness; south--Dog Canyon and Upper Tater Canyon; west--Forest Roads 462 and 641 and Cane (sometimes spelled Kane) Canyon. The legal location is:

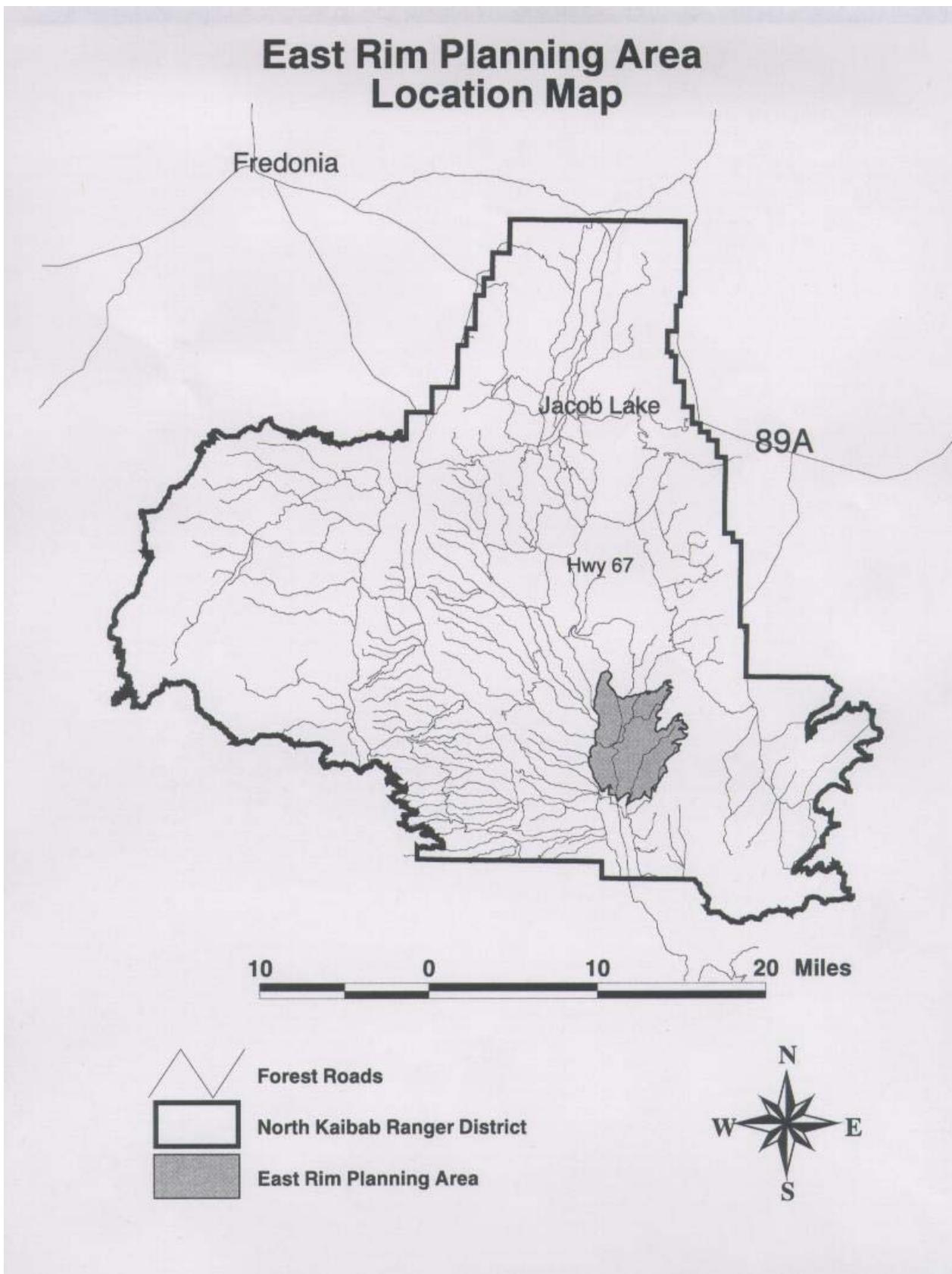
T36N, R3E, Secs. 19, 20, 21, 28-34

T36N, R2E, Secs. 13, 14, 23-26, 35 & 36

T35N, R3E, Secs. 3-10, 16-21, 28, 29 & 30

T35N, R2E, Secs. 1-2, 11-14, 23-25

This document and analysis tiers to the Kaibab National Forest Plan Environmental Impact Statement, Kaibab National Forest Land Management Plan (KNFLMP, sometimes referred to as the “Forest Plan”), as amended, and East Rim MSR (February 1994). The East Rim Planning Area contains 17,216 **acres** and includes parts of Management Areas 13 (which is a combination of former Management Areas 13, 14, 15, 17 and 18) and 21 of the Kaibab National Forest Plan. Management Area 21 contains two developed recreation areas: De Motte Campground, a Forest Service campground operated under a special use permit, and the privately owned Kaibab Lodge and North Rim Country Store operated under a special use permit by Canyoners, Inc. Arizona Highway 67 runs through the East Rim area and has been designated a National Scenic Byway (please see the map on the following page).



## C. PROPOSED ACTION

The proposed action, as identified in the January 2001 scoping document (#143 in the Project Record), is to manage the vegetation resources within the East Rim Planning Area to bring them closer to the desired condition. This proposal follows direction in the KNFLMP as amended; specifically, it implements treatments to provide habitat for potential Mexican spotted owls, enhance habitat for northern goshawks and allocate and manage old growth. This proposed action also complies with the other standards and guidelines in the KNFLMP, including reserve trees, future forest site and forage conditions, identification of heritage properties, surveys for Threatened, Endangered and Sensitive (TE&S) species, fuels operations and thinning.

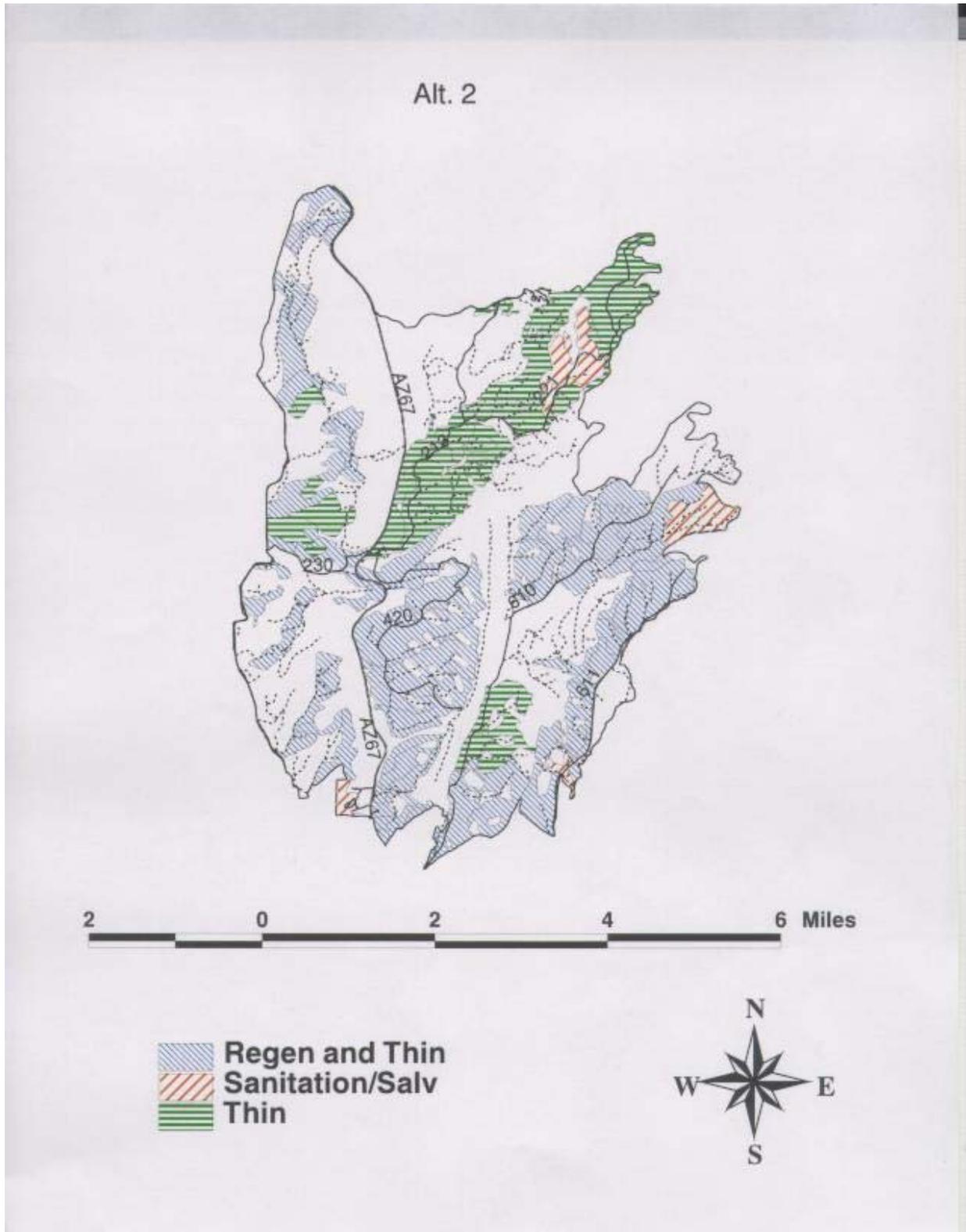
Specifically, the proposed action is to:

- Regenerate (create conditions for seedlings) 290 acres of conifer species.
  - ✓ Site preparation and tree planting of containerized ponderosa pine and Douglas-fir from the appropriate elevation zones in selected regeneration groups.
  - ✓ Small **group selection** or **irregular group shelterwood** cuts would be 1/4 to 4 acres in size; insect and disease treatments may exceed 4 acres but not exceed 10 acres.
  - ✓ No regeneration in existing goshawk **nest areas** or replacement nest areas.
  - ✓ Treatments to be in tree groups where the average diameter is 12 inches and larger.
  - ✓ Regeneration and thinning treatments would occur in each northern goshawk **audit unit**.
  - ✓ Approximately 10% of the total Planning Area acreage would be in the tree seedling stage just after treatment.
  - ✓ Regeneration acres would come from: VSS 4 groups (250 acres), VSS 5 groups (70 acres) and VSS 3 groups (20 acres)—all acreages approximate.
  - ✓ The 50 acres done under the Sanitation/Salvage treatments (below) is included in the VSS distribution above.
- Thin, commercially and non-commercially, approximately 7,500 acres.
  - ✓ Use irregular spacing.
  - ✓ Remove suppressed, understory fir and spruce to reduce fuel ladders.
  - ✓ Thinning may move groups into the next higher VSS class due to thinning being done mainly from below, which removes the smaller diameter trees from below the larger trees in the group. This could result in the group having a higher average diameter.
  - ✓ No thinning would be done in existing goshawk nest areas. Thinning from below would occur in 485 acres of replacement nest sites.
  - ✓ Treat one 155-acre stand to 170 BA using individual tree selection to maintain target/threshold stand conditions for MSO and eight other stands to place them on a trajectory to attain target/threshold conditions. The acres are included in the thinning acres above.
  - ✓ 1949 acres of old growth as defined by the KNFLMP would be treated in this alternative. These treatments would consist of thinning from below to the **Post-fledging Family Area** (PFA) levels and retaining all trees over 18" DBH. The residual tree stocking would be at or above the stocking identified for old growth in the KNFLMP. These acres are included in the thinning acres listed above.

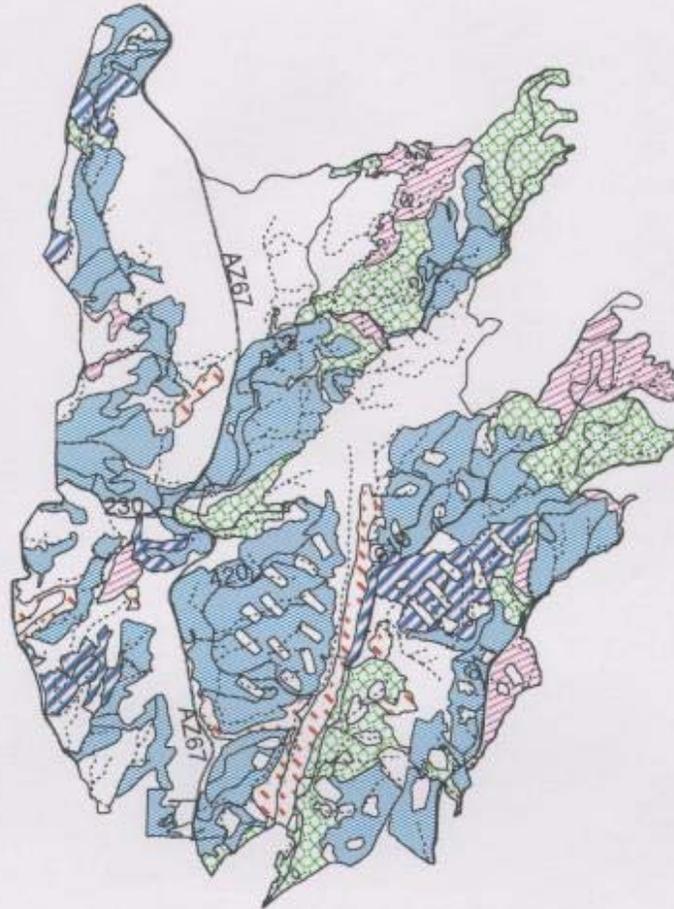
- ✓ Accomplish treatments using timber sale contract provisions, brush disposal funds, appropriated money and fuelwood gathering. Knudson-Vandenberg funds would also be used, as might a stewardship pilot program.
- Perform a **sanitation/salvage** treatment in two stands with groups of trees severely infected with **dwarf mistletoe**--26 acres in one stand and 24 acres in the other stand.
  - ✓ All dwarf mistletoe-infected trees would be removed in those stands and the areas planted if no uninfected understory exists.
  - ✓ The remaining 400 acres in these stands are included in the thinning acres shown above.
  - ✓ Remove infected trees that occur as very small groups or individual trees on about 500 additional acres (acres included in thinning acres above).
- Treat existing (live and dead) and activity-generated fuels using prescribed fire and mechanical methods.
  - ✓ Approximately 1,440 acres of existing fuels and 8,190 acres of activity-generated fuels.
  - ✓ Utilize **lopping, machine piling**, and jackpot and **pile burning** to move toward 5-7 tons per acre of down woody material in ponderosa pine stands and 10-15 tons per acre of down woody material in mixed conifer stands.
- Maintain **fuelbreaks** along FR's 611, 610, 213, 230, 462 and 641.
- Treat a total of approximately 2,300 acres of old growth as defined by either the existing Kaibab Forest Plan as amended or allocated in accordance with the Kaibab Forest Plan of 1987.
  - ✓ The latter areas, when not among the stands best meeting the old growth definitions of the Forest Plan amendment of 1996, are no longer classified as old growth by the Forest Plan.
  - ✓ Treatment would include thinning from below to equal or exceed the minimum **basal areas** for old growth (for the appropriate forest cover type) contained in the Forest Plan guidelines and retain all trees 18 inches in diameter or larger.
  - ✓ These areas are included in the thinning acres above.
- Close or re-close approximately 90 miles of roads used for harvesting timber and associated activities.
  - ✓ Generally short, low-standard, dead-end roads, most of them previously closed.
  - ✓ Forest Roads 610, 611, 230, 213, 462, 641, 221 and 420 would remain open.
- The **commercial thinning**, group selection and sanitation treatments above would be expected to result in timber sales totaling roughly 8 **MMBF** (1 MMBF equals 1,000 board feet).

The original Management Situation Report and the Proposed Action Report detailed additional proposed actions. These actions may take place in the future under separate NEPA processes, but those actions have been removed from this proposal to focus on specific vegetation items—reducing tree densities, sustaining structural stages and reducing **fuel loading**, both live and dead.

Two maps portraying the Proposed Action's (Alt 2) treatments are found on the following pages.



### Fuels Treatment - Alt. 2



-  JACKPOT BURN
-  LOP/JACKPOT BURN
-  MPILE
-  MPILE/LOP
-  RX BURN



## D. PURPOSE AND NEED

The purpose of the proposed treatments (see docs. #143 and #162) is to:

- Produce the size class (VSS) distribution described and implied in guidelines for the northern goshawks in the KNFLMP, and create clumps of trees within larger groups, a situation that favors a variety of wildlife species. This includes opening small areas to create the conditions that encourage the germination and growth of seedlings and will thus provide the large old trees of the future.
- Reduce ladder fuels and other live and dead fuels in order to reduce the threat of wildfire. Move toward the levels of dead fuels recommended in the KNFLMP.
- Protect and maintain goshawk habitat in accordance with the KNFLMP; encourage growth into larger VSS classes.
- Maintain and enhance old growth characteristics in accord with the KNFLMP while reducing fire risk to old growth stands, other stands and human facilities in the area; maintain Mexican spotted owl (MSO) habitat in accordance with the KNFLMP—more specifically, manage stocking and size distribution to place such stands on a trajectory toward target/threshold stand conditions for MSO. It is desired to have 100% of the target and threshold stands meet threshold conditions, but at present only 16% of the acreage does so.
- Maintain or slightly increase the acreage in ponderosa pine and Douglas-fir; the intent is to perpetuate the ponderosa pine and Douglas-fir groups that presently exist—that is, get the small groups to regenerate and thus ensure the presence of the species in those stands in the future.
- Reduce the infection centers for dwarf mistletoe in accordance with KNFLMP direction to “salvage stands... moderately or severely damaged by dwarf mistletoe.”
- Maintain roads for public access while closing unneeded roads and reducing the miles of road to a level than can be maintained with reasonably foreseeable budgets.

The existing vegetative structural stages (VSS) differ from the percentages recommended in the KNFLMP (see Table 1). VSS is based on the structural characteristics found within tree diameter classes. The column titled “Existing Percentages” in Table 1 notes the range of percentages within the particular VSS class in the six PFAs and seven goshawk audit units (AUs) in the Planning Area. The desired condition is to provide the desired percentage in each VSS class within each PFA and AU.

**Table 1. Existing and Desired Vegetative Structural Stages.**

Vegetative Structural Stage	Desired Percentages	Existing Percentages
VSS 1 = Grass & Tree Seedlings	10%	2 PFAs near or above; 4 low 3 AUs near or above; 4 low
VSS 2 = Saplings	10%	4 PFAs near or above; 2 low 5 AUs near or above; 2 low
VSS 3 = Young Forest	20%	5 PFAs near or above; 1 low 5 AUs near or above; 2 low
VSS 4 = Mid-aged Forest	20%	5 PFAs near or above; 1 low 6 AUs near or above; 1 low
VSS 5 = Mature Forest	20%	4 PFAS near or above; 2 low 6 AUs near or above; 1 low
VSS 6 = Old Forest	20%	6 PFAs low; 7 AUs low

The reasons for proposing actions in the East Rim Planning Area are:

- 1) The area is out of line with the VSS structure desired in the KNFLMP; in particular, as Table 1 indicates, there is a widespread shortage of stands dominated by trees in excess of 24 inches in diameter and a shortage of tree seedling groups (as distinct from young trees growing under the canopy of larger trees).
- 2) The existing dead and live fuels have definite potential to feed a destructive wildfire, endangering firefighters and the public alike and possibly consuming facilities and valuable wildlife habitat. The increased fuel loading, along with the increased tree densities and increased percentage of fire-intolerant species, creates conditions conducive to high-intensity, stand-replacing wildfires. Such wildfires could move visual, wildlife, recreation and vegetative conditions further from the desired condition than they currently are. Although the Kaibab Forest Plan directs fires to be restricted to no more than 20 acres each, over 2,000 acres within the Planning Area have burned in two relatively large wildfires in the past 20 years. The down fuel within the ponderosa pine areas averages 7 tons per acre, and the fuel within the mixed conifer stands averages about 12 tons per acre. Both of these averages are within the loadings recommended in the KNFLMP (5-7 tons for pine and 10-15 tons for mixed conifer), but there are stands and larger areas within the Planning Area where the fuel loading considerably exceeds those recommended in the Forest Plan.
- 3) Besides the possibility of fueling a wildfire, the densely stocked understory in much of the Planning Area has slowed the growth of individual trees and reduced the capacity of the area to serve as wildlife habitat. The combination of factors such as wildfire suppression efforts over the last 100 years and grazing practices near the turn of the century has allowed tree seedlings to survive at levels 6-10 times as high as those levels found prior to European settlement of the area. This has led to tree densities outside the historical range of variability. Many stands are stagnated in the 5-18 inch diameter (young to mid-aged forest) classes. Without some management activity, these stands are capable of growing into larger diameter classes only over an extended period of time. Table 2 indicates that in a large portion of the area there is strong competition between trees and that the change over time is toward “trees dying due to stress.”

**Table 2. Tree Competition at varying SDI.**

<b>% Maximum Stand Density Index</b>	<b>Acres</b>	<b>Conditions</b>
<25%	1,774	No competitive interaction between trees if trees are evenly spaced. Individual tree growth at maximum potential.
25-35%	3,907	Competition between trees has begun so tree growth below maximum potential. Stand growth also is below max. potential.
>35%	5,860	Strong competition between trees. Tree growth below maximum potential, but stand growth is at maximum potential.
>60%	309	Trees dying due to stress caused by competition between trees.

- 4) Old growth characteristics could be lost due to the competition from large numbers of understory trees and the fire threat (that is, fuel loading) they represent.
- 5) The ponderosa pine component, important to some wildlife species, has been reduced due to past actions and the succession of more shade-tolerant species. The forest in East Rim

is moving toward a more late **successional**, less fire-resistant condition. Ponderosa pine and Douglas-fir in many areas only occupy the overstory and are not able to regenerate due to closed canopy conditions. White fir is increasing in many areas due to its more shade-tolerant nature.

- 6) Dwarf mistletoe is weakening and stagnating certain stands that have high levels of mistletoe infection, thus not allowing them to reach the desired larger diameter VSS classes and become old growth. The acres of infection level of dwarf mistletoe in the East Rim Planning Area are: high level of infection – 142 acres; moderate level – 46 acres; low level – 100 acres; and no infection known – 12,166 acres. Unless the dwarf mistletoe stands are treated, they will not attain old growth characteristics. The desired level would be close to zero acres in the high level of infection.
- 7) There are many miles of road in excess of what appears to be needed to provide for a variety of land uses, and Forest Service resources are insufficient to provide maintenance for much of that road system within the East Rim Planning Area.

**Table 3. Differences Between Existing and Desired VSS Conditions**

<b>Component</b>	<b>Existing</b>	<b>Desired</b>	<b>Difference</b>
VSS 1	3%	10%	-7
VSS 2	4%	10%	-6
VSS 3	35%	20%	+15
VSS 4	29%	20%	+9
VSS 5	15%	20%	-5
VSS 6	14%	20%	-6

The intent is to maintain the distribution of vegetative structural stages (VSS) shown in the “Desired” column in Table 3 in each goshawk PFA and Audit Unit (AU). There are six PFAs and seven AUs at least partially within the Planning Area. The percentages shown in the “Existing” column are based on averages throughout the Planning Area. The “+” for VSS 3 and 4 indicates there is a surplus in those two VSS classes.

## **E. PROJECT SCOPING**

The Management Situation Report was mailed in February 1994 to 57 interested groups and individuals.

The Proposed Action Report was sent to 63 interested groups and individuals in October 1994 (doc. #48).

Field trips to the East Rim area were conducted in October 1994 and July 1995 (docs. #45 and #83).

An earlier version of the East Rim EA was sent out for a 30-day comment period in December 1997 (doc. #118). Three comment letters (docs. #128, #130 and #131) were received. A management decision was made not to issue a decision based on the original EA.

From 1998 to present, the District has been involved in a collaborative process looking at the implementation of the old growth standards and guidelines contained in a 1996 amendment to the Kaibab Forest Plan. Prior to making a decision on East Rim, this process was allowed to move forward. This old growth process, along with coordination begun in 1998 with U.S. Fish and Wildlife Service (US F&WS) and with the Mexican spotted owl recovery team, has delayed the process on East Rim.

Since the earlier review EA was made available to the public, coordination with the US F&WS, collaboration concerning old growth on the North Kaibab and collaboration efforts in conjunction with Kane Ranch Planning have helped the District stay in touch with the public's interests and concerns.

In January 2001, a letter (doc. #143) was mailed to 38 interested groups and individuals to scope on a new proposed action. Five comment letters were received in reply.

## F. ISSUES

To be an issue, a comment must state that because of the specific proposed action a specific undesirable consequence is likely to occur.

Although a number of comments were made in response to the Proposed Action document provided to the public in January 2001, many of the comments were process concerns and many were requests for additional information. Other comments concerned policy or the legal status of resources in the Planning Area. Among the resources mentioned were flammulated owls, Grand Canyon National Park, Grand Canyon National Game Preserve, Kaibab Squirrel National Natural Landmark, and critical habitat for the Mexican spotted owl. When comments did not specify disagreement with the proposed action and a potential effect on the resources, they were--after consideration--determined to be non-issues.

### **Concerns Considered but Resolved Through Mitigation Measures/ or Design Criteria**

Some concerns, both internal and external, have been resolved through mitigation measures or design features. See Project Record document #152 for a more complete listing of mitigation measures. See document #157b for a display of the consideration and disposition of comments.

- *Dispersed recreation could be affected by timber harvesting activities.* Resolved through the mitigation measure coordinating landing locations and fuels treatments with dispersed camping sites and through project design features that would leave large numbers of trees throughout the Planning Area.
- *Productivity and health of soils and vegetation could be affected by logging activities.* Resolved through the application of Best Management Practices and mitigation measures that control the location of skid trails, roads and landings.
- *Air quality could be affected by **management-ignited prescribed fires**.* Resolved through the mitigation measure that ensures air quality measures established by the Arizona Department of Environmental Quality will be followed.
- *Artificial regeneration of ponderosa pine has been poor in parts of the East Rim area in the past, and that situation could be perpetuated by the*

*Proposed Action.* Resolved by specifying that containerized ponderosa pine and Douglas-fir from the appropriate elevation zone would be used on all regeneration treatments which require artificial regeneration.

- *Habitat for Threatened, Endangered and Sensitive (TE&S) Species could be impaired.* Resolved by clarifying what threatened or endangered plant or wildlife species are known to exist within the East Rim area: that is, there are no T&E species known to reside there. Mexican spotted owls (MSO) have historically been reported on the North Kaibab Ranger District, but breeding has not been confirmed. Mixed conifer is being managed to maintain or enhance conditions that would provide habitat for MSO. A July 2000 letter from the U.S. Fish and Wildlife Service (doc. #139a) states that “any surveys conducted since 1990, and any conducted in the future, that meet the currently-used survey protocol and fail to detect spotted owls, will be sufficient to justify elimination or non-designation of a PAC at a historical site.” Scattered throughout the East Rim Planning Area are approximately 8,200 acres of restricted Mexican spotted owl habitat (mixed conifer cover type); in accordance with the KNFLMP, concern about those stands has been resolved by project design to either do no treatment in those stands or manage those stands to move toward MSO target conditions faster than doing nothing (see USFWS concurrence letter document #180 in the East Rim Project Record). Apache trout are located outside of the planning area within the Saddle Mountain Wilderness. Some effect to this species is expected, but neither the trout nor their habitats are likely to be adversely affected (see USFWS concurrence letters document #179 in the East Rim Project Record).

The northern goshawk is a Forest Service sensitive wildlife species found in the East Rim Planning Area. Because the management proposed follows direction in Kaibab Forest Plan to improve and maintain goshawk habitat, this is not a project issue; that is, it has already been decided in the KNFLMP. Implementation of the goshawk standards and guidelines in the Kaibab Forest plan is the foundation for the vegetative treatments in the proposed action. An examination of the effects of actions very similar to the proposed action has indicated a beneficial impact on the northern goshawk.

Two Forest Service sensitive plant species exist in the meadows: Kaibab bladderpod and Kaibab paintbrush. A mitigation measure to protect these species ensures that the meadows, and therefore these species, will be avoided during tree manipulation activities.

- *Traffic and noises associated with management activities may temporarily displace some wildlife from the area.* Resolved through mitigation measures precluding vegetative management activities within ¼ mile of sharp-shinned hawk nests between April 1 and August 15, within established goshawk PFAs between March 1 and September 30 or within ½ mile of peregrine falcon eyries between March 1 and September 1.

- *Vegetative treatments along Arizona Highway 67, Forest Roads 610 and 611, the Arizona Trail, and East Rim Overlook could adversely affect the visual quality of the area.* Resolved by mitigation measures such as setting an upper size limit to regeneration openings in Foreground Retention and Partial Retention areas, requiring **slash** to be removed from the immediate foreground in Retention areas prior to acceptance by the Forest Service under the

Timber Sale Contract, requiring that ground disturbance be kept to a minimum and requiring stumps in the immediate Foreground Retention areas not be evident to the casual observer.

### **Significant Issue**

The following significant issue was identified and considered in detail during the project development stage. This issue influenced alternative design and helped define the scope of the environmental concerns to be addressed in this environmental assessment.

*Removing trees in old growth stands would diminish habitat for the northern goshawk and other wildlife species.* This issue was mentioned by both Southwest Forest Alliance and Center for Biological Diversity.

## **G. THE DECISION TO BE MADE**

The Kaibab National Forest Supervisor will decide whether to:

- Implement an action alternative, or
- Continue the present management on the East Rim Planning Area (implement the "no action" alternative, Alternative 1), or
- Require that the interdisciplinary planning team undertake additional analysis and/or develop additional alternatives, or
- Develop an environmental impact statement.

## II. ALTERNATIVES

### A. INTRODUCTION

Chapter II presents the management alternatives developed to move the vegetation resources in the East Rim Planning Area from their existing condition toward their desired condition.

### B. ALTERNATIVES CONSIDERED BUT DROPPED FROM DETAILED ANALYSIS

**4. Meadow and Aspen Restoration** - The restoration of meadows and aspen stands to pre-settlement conditions was considered before the analysis for the previous version of the East Rim EA. After a review of the literature and discussions within the planning team, it was decided that there was not enough information at this time to make a decision on the pre-settlement condition of the meadows and aspen stands. Therefore, no meadow restoration to pre-settlement conditions has been proposed under this project.

**5. Stand Replacement Fire to Create Pure Aspen Stands** - Using stand-replacement fires to improve the distribution of aspen stands was considered before the previous version of the East Rim EA. The East Rim area has a good component of aspen, and treatment may be proposed later along Arizona Highway 67 to increase the acres of pure aspen stands in that area. Due to the risk (high mortality and possible wildfire situation as seen in the De Motte and Point Fires) of using stand-replacement fire as a management tool and also to the fact that aspen stands are well represented in the East Rim area, this alternative was dropped from further analysis.

**6. National Recreation Area** - An alternative considered before the earlier version of the EA was to create a National Recreation Area in the present East Rim area. It also involved a non-motorized area that included the East Rim Planning Area. This alternative was perceived to be beyond the scope of this analysis, and was not considered further.

**7. Higher residual level after thinning** – An alternative was proposed that would retain a higher level of stocking after treatment and would do no regeneration treatment except individual group selection in Mexican spotted owl **restricted areas**. This suggested alternative was not responsive to any issue and is quite similar to the Proposed Action, so it too was dropped from further analysis.

**8. Prescribed fire as first tool** - An alternative was proposed that would utilize fire instead of logging to reduce stocking and also reduce the risk of a stand-replacing wildfire. Preliminary analysis showed a great risk of destructive fire damage during treatment and no economic benefit to the local communities. Because of the threat to live trees of using fire in that area before reducing stand densities, this alternative was dropped from further study.

**9. No Harvest/Restoration** – An alternative was proposed that would utilize only natural disturbance processes. Because this alternative would not achieve important parts of the Purpose and Need (such as protection of the recreation facilities from destructive wildfire, road closures, and movement toward the desired VSS structure) in the desired timeframes, it was dropped from detailed study.

## C. ALTERNATIVES CONSIDERED IN DETAIL

Details of the alternatives are presented in a table after a narrative description of the alternatives. Maps of the treatments of Alternative 3 are presented on pages that follow.

Roads that would remain open under all Alternatives are 462, 641, 230, 213, 420, 611, 610 and 221.

### **Alternative 1 (No Action)**

Currently approved activities would continue, including continued fuelwood and Christmas tree harvesting. The activities in the Proposed Action and the alternatives to it would not take place.

The activities in the Proposed Action would not take place at this time, but could be considered under separate NEPA documentation. This alternative provides a baseline for comparison of the other alternatives.

### **All Action Alternatives**

Alternatives 2 and 3 are collectively called the "action" alternatives. Each would maintain approximately 1350 acres of fuelbreaks along Forest Roads 611, 610, 213, 230, 462 and 641. Fuelbreaks would be maintained through treatment of existing fuel loadings by management-ignited prescribed fire, **thinning, hand and machine piling, and lopping.**

Both of the action alternatives would close or re-close approximately 90 miles of road—low quality roads constructed to access timber harvest areas.

### **Alternative 2**

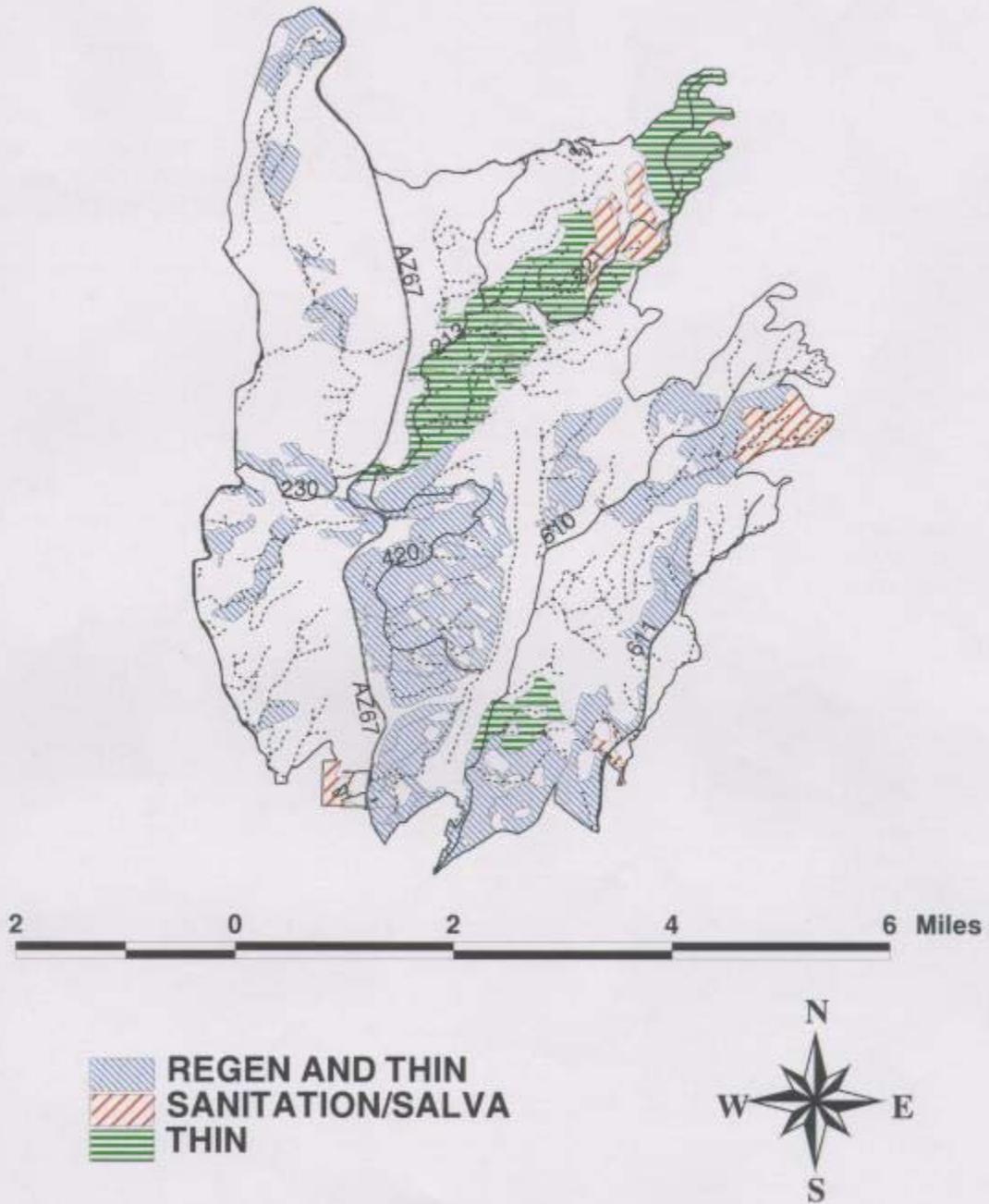
Alternative 2 is the Proposed Action—identified and described in Chapter 1.

### **Alternative 3**

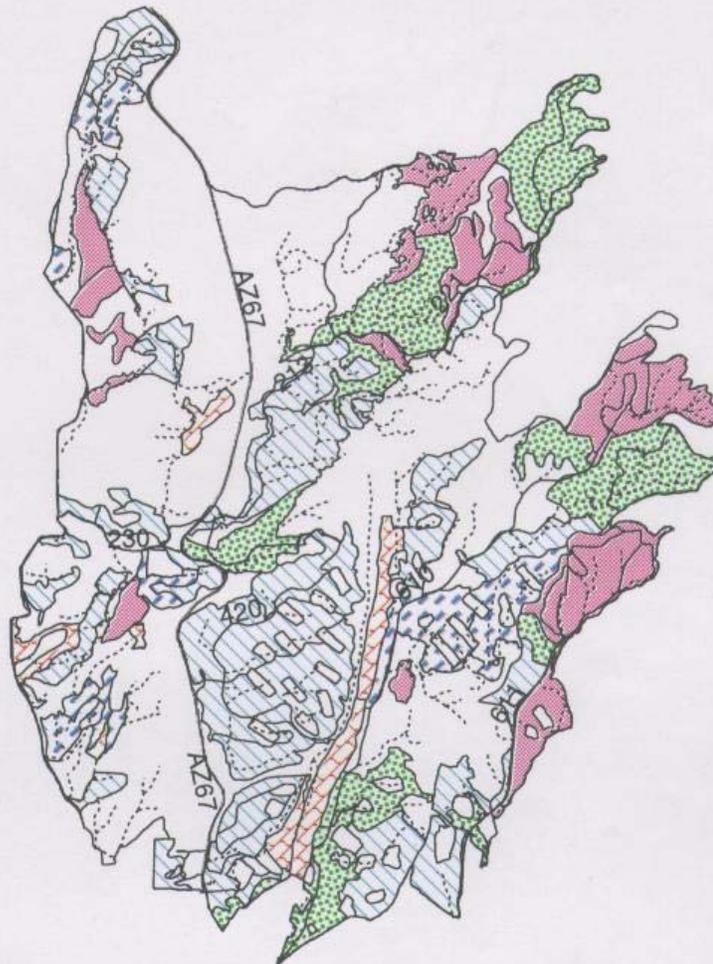
This alternative is the same as the proposed action except that it would do no commercial or non-commercial tree removals either in the stands formerly allocated as old growth or in the stands meeting the KNFLMP definition of old growth. This includes no regeneration cutting, no sanitation treatments and no thinning in the 2321 acres of old growth stands.

This alternative complies with the amended KNFLMP. This alternative would include approximately 2308 fewer acres of thinning. This is estimated to result in a timber harvest of approximately 6.5 MMBF. Maps portraying the treatments of Alternative 3 are found on the following pages.

Alt. 3



### Fuels Treatment - Alt. 3



-  JACKPOT BURN
-  LOP/JACKPOT BURN
-  MPILE
-  MPILE/LOP
-  RX BURN



**D. SUMMARY OF ACTIVITIES AND EFFECTS**

**Table 4. Summary of Activities Proposed by each Alternative**

Activity	Alternative		
	1	2	3
<b>Vegetative Activities</b>			
Regeneration (acres)	0	290	290
Sanitation/Salvage (acres)	0	553	540
Commercial/non-commercial thinning trees (acres)	0	7531	5223
Thinning in replacement nest areas (acres)	0	up to 485	about 315
Tree planting (acres)	0	up to 340	up to 340
<b>Fire and Fuels</b>			
Fuelbreak maintenance (acres)	0	1350	1350
Machine pile existing fuels (acres)	0	811	811
Jackpot burn existing fuels (acres)	0	627	499
Machine pile/Lop activity fuels (acres)	0	5877	3697
Lop/Jackpot burn activity fuels (acres)	0	2312	2044
Management-ignited fire (total acres)	0	1019	1771
<b>Volume produced (MMBF)</b>	0	8	6.5

Timber volume is an estimate based on prescribed treatments and is used in the economic analysis.

**Table 5. Summary of Consequences of Each Alternative**

	Alternative 1	Alternative 2	Alternative 3
<b>Old Growth Issue</b>			
Acres meeting Forest Plan Table 15	1287	1287	1287
Acres of OG with no tree removals	2321	0	2321
OG acres with fire risk reduced	0	2321	0
<b>Environmental Effects</b>			
Approx. acres of soil impaired by fire	0	128	105
Cover type at year 5	Moving toward more MC	Moving toward more PP	Moving toward PP in treated areas
VSS at year 5	No movement toward desired condition	Moving toward desired condition	Moving toward desired condition in treated areas

	Alternative 1	Alternative 2	Alternative 3
Estimated increase in number of PFAs or AUs meeting desired VSS %			
----VSS 1	0	4	2
----VSS 2	0	1	0
----VSS 4	0	1	0
----VSS 3, 5 and 6	0	0	0
Present net value \$	(50,000)	896,412	689,727

The wording in the Alt. 3 column on the rows “Cover type at year 5” and “VSS at year 5” reflects the differences in acres treated by the two action alternatives, but not all acres are treated by Alternative 2 either.

In summary, the differences between Alternative 1 and the action alternatives are large, especially related to such concerns as tree health and vigor, reduction of fuel loading and thus fire risk, movement toward the desired distribution of VSS classes, enhancement of clumpiness and forest conditions desired for northern goshawk habitat. For those criteria, the action alternatives greatly surpass the “no action” alternative. Alternative 1 would provide less likelihood of wildlife disturbance.

The differences between Alternative 2 and Alternative 3 are more a matter of degree and perspective. Alternative 2 does a more thorough job of moving toward the desired conditions; that is, it does so on a larger acreage. By not implementing tree removals in old growth, Alternative 3 would be more cautious and could be seen as preserving options for the future. On the other hand, Alternative 3 would not do the treatments in old growth proposed in Alternative 2 to maintain old growth characteristics and vigor, improve northern goshawk habitat, maintain MSO habitat, provide for a flow through time of size classes and reduce dwarf mistletoe infection centers. By being more cautious and not treating in old growth stands, Alternative 3 would allow the potential for stand-replacing wildfire that might well appreciably reduce the presence of old growth and habitat for wildlife species such as northern goshawk and Mexican spotted owl.

**E. MITIGATION MEASURES/DESIGN CRITERIA AND MONITORING**

Included in the design of action alternatives are applicable standards and guidelines from the Kaibab National Forest Plan as amended, Forest Service timber sale contract provisions, and special mitigation measure and design criteria.

Among the other mitigation/design features are:

- Blend the cleared edges of the mature overstory. The conifer removal should open up views into the forest and appear natural.
- New stumps in the immediate foreground Retention areas will not be evident to the casual observer. This can be met by cutting stumps as low as possible (a maximum of four inches high).
- Retain the denser clumps of trees 5-18” in diameter to provide truffle production and nest tree sites. This can be accomplished using irregular spacing when thinning.

- Retain all trees 24” in diameter and larger in Restricted Areas (mixed conifer habitat).
- Utilize a 50-foot no-harvest zone from the edge of meadows, directional felling of trees away from the meadows and no new roads or skid trails being placed in meadows or within 50 feet of meadows. In meadow areas, vehicular traffic will be allowed to use only existing roads, and staging of equipment or personnel will not be allowed in meadow areas.
- Native seed mixtures stipulated by the Forest Service will be used for seeding closed roads, skid trails and landings. All seed will be certified as weed-free.
- Within fuelbreaks, ponderosa pine and Douglas-fir trees nine inches in diameter and larger will be favored for retention.
- Coordinate prescribed burning with pre-commercial thinning to ensure timely and adequate treatment of thinning fuels.
- Roads needed to access areas needing post-harvest treatments—such as tree planting, management-ignited prescribed burns or other fuels treatments—will be left open after the timber sale. These roads will be closed by the Forest Service upon completion of post-sale activities.

See document #152 in the project record for a listing of mitigation measures and design criteria. That document is incorporated here by reference, and the measures in it are to be considered as binding as if they appeared here in the EA. Most of these measures are KNFLMP direction, and they have been used successfully many times in the past to ensure no appreciable adverse effects on resources.

Document #151 in the project record indicates the monitoring that is to be done if an action alternative is selected.

### III. ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND THE ALTERNATIVES

The significant issue identified in Chapter 1 defines the scope of environmental concern for this project. This chapter summarizes the expected environmental consequences of each alternative. Resource specialist reports were used as the basis for the following discussion of environmental effects of the activities on the issue raised and for the summary of effects provided in the Analysis of Significance subsection. The resource reports are part of the East Rim Project Record. Alternative 1, the "no action" alternative, reflects the existing condition and provides a baseline for the effects of other alternatives.

Some of the environmental effects are confined to this action and the project area. Others are cumulative with environmental effects from other actions and cover an area beyond the project area.

See document #118 in the Project Record for descriptions of the existing conditions—the affected environment.

#### A. ISSUES

*Removing trees in old growth stands would diminish habitat for the northern goshawk and other wildlife species.*

The Kaibab National Forest Land Management Plan provides by **cover type** structural attributes that should be met or exceeded for a stand or other unit of land to be considered old growth in the Southwest.

Table 6 is a simplified version of the Old Growth Habitat Characteristics table in the KNFLMP.

**Table 6**

Forest Cover Type	Ponderosa Pine	Mixed Conifer	Engelmann Spruce Subalpine Fir
Live Trees/Acre	20	16	20
DBH	18"	20"	14"
Age (years)	180	150	140
Dead Trees/Acre	1	2.5	4
DBH	14"	16"	16"
Height (feet)	25	25	30
Down Pieces/Acre	2	4	5
Diameter	12"	12"	12"
Length (feet)	15	16	16
Total BA (sq ft/acre)	90	100	140
Total Canopy Cover (%)	50	60	70

Part of the analysis of the issue focuses on the acreage that, after implementing each alternative, would meet the above characteristics. Another part focuses on old growth as habitat for northern goshawk and other wildlife species.

#### *Acreage of Old Growth*

Ecosystem Management Area (EMA) 13 contains approximately 268,719 acres, including the East Rim Planning Area, and for the purposes of the old growth analysis is considered to be the landscape. Approximately 28% of EMA 13 currently meets the old growth criteria in the amended KNFLMP. Approximately 19% of the East Rim Planning Area meets the old growth criteria (see doc. #113).

The KNFLMP provides for managing for at least 20% old growth at the ecosystem (EMA) scale and does not require that old growth distribution be by forest type. In the ponderosa pine and aspen forest types, at least 20% of the acreage meets the old growth characteristics in the KNFLMP.

The acreage of old growth in East Rim would remain unchanged in all alternatives. Approximately 6500 acres (approximately 43% of the Planning Area acreage) would either meet the criteria immediately after treatment or would be placed on a trajectory to achieve them.

Alternative 1, No Action, would result in no change in the short term. Change would result from tree growth, insects, diseases and possible destructive wildfire.

Alternative 1 would retain all large trees (trees greater than 18" in diameter) in the short-term, but the ability to grow big trees for their replacement in the future would be limited and increasingly confined to shade-tolerant species. Young trees in dense groups would not attain the large diameter of current old trees due to extreme **competition** for moisture, light and nutrients. Tree density would continue to increase, but individual tree growth would stagnate while trees per acre increased up to the point where the growth per acre would be less than the mortality per acre. If Alternative 1 were implemented, the likelihood of a wildfire removing old growth characteristics and desired wildlife habitat would continue to increase.

Alternative 2, the Proposed Action, would preserve old growth after treatment and would meet criteria in the KNFLMP after treatment. This is because the proposed treatment is to thin from below and retain the large trees that permit the stands to meet the old growth criteria.

Treatment is proposed for most old growth stands in this alternative. Treatment prescriptions would retain at least the minimum basal area--for old growth in the particular cover type according to the amended KNFLMP--and all trees greater than 18" (20" in mixed conifer) except where removal would be necessary due to disease. All areas that were previously identified as old growth in the 1987 amendment to the Forest Plan would also be treated in this manner. These stands would either meet the old growth criteria after management or would be managed in a manner to achieve them over time if not currently meeting them. Additionally, goshawk PFA's, both ponderosa pine and mixed conifer, would be managed at levels that would meet the old growth criteria over time, as would target and threshold stands within MSO restricted habitat.

At a scale below the site level, 20% of the acreage in goshawk **foraging areas** would be

managed for tree size and density that exceed the criteria in the Forest Plan. This would occur in tree groups rather than in stands, so it is uncertain how much of that acreage is unaccounted for in the 43% cited above.

Alternative 2 proposes actions that would help the old growth stands by 1) decreasing competition of other trees with the large-diameter trees, 2) thus allowing those trees greater growth potential and greater average life expectancy and 3) decreasing the likelihood of mortality due to wildfire because of the removal of ladder fuels that would facilitate fire ascending into the crowns of the large trees.

Thinning may move groups into the next higher VSS class because of the removal of smaller diameter trees from below the larger trees in the group. This will not only maintain the vigor of the larger trees but also increase their growth into the larger classes and lead to more stands and groups meeting the old growth tree diameter criteria over time.

Alternative 3 would also retain the present acreage of old growth. That is, after implementing Alternative 3, the same acreage would meet the old growth criteria in the KNFLMP. Alternative 3 would also manage tree groups toward 20% of the acreage being in VSS 6 and meeting the other old growth criteria. It would also manage MSO stands at a level that would meet or exceed the old growth criteria in the KNFLMP.

Alternative 3 would also preclude disturbance within the old growth stands. It would result in all stands that presently meet the old growth criteria in the KNFLMP meeting them after treatment, as in the other two alternatives. Since Alternative 3 proposes no treatment within any of the old growth stands, it ranks nearly as high as the No Action alternative on the criteria of disturbance. Alternative 3 would implement treatment in stands adjacent to old growth, which theoretically at least could result in disturbance.

Thinning would likely move groups into the next higher diameter class, as described in the discussion of Alternative 2, but there would be less acreage of this than in Alternative 2. In both Alternative 2 and Alternative 3, densities after treatment in areas outside of old growth would be at levels that would allow smaller trees to grow into the big tree component; thus, in the long term, the flow of the big tree component through time would become more stable.

Under all alternatives, the percentages of the East Rim acreage meeting the Forest Plan old growth criteria would exceed the minimum requirement of 20%--at the group level, the site level, the PFA level and the landscape level. See document#113 in the project record for a detailed analysis of old growth acreage.

*Cumulative Effects.* The existing old growth and areas to be managed toward old growth total approximately 61% of the acreage. This includes the areas to be managed as old growth below the site level on a tree group basis (groups of VSS 6), MSO Recovery Plan restricted habitat, and northern goshawk PFAs. Excluding the former 803's (specific areas designated as old growth), this is the type of management that has been implemented on the District in recent years, and the expectation is that similar management would be continued.

### *Old Growth as Wildlife Habitat*

Alternative 1 would take no action to enhance or maintain wildlife habitat. The difference between the desired and the existing VSS distribution would continue to worsen unabated. The vigor of the tree stands, many of them already overstocked, would continue to decline toward stagnancy. Ponderosa pine would continue to slowly disappear from these stands, as it is unable to successfully reproduce in the shade of the densely stocked stands. Replacement nest stands would not be helped toward becoming fully functional nest habitat.

With Alternative 1, thousands and thousands of acres of densely stocked stands in the Planning Area would continue to grow denser and limit the opportunity for biological diversity. The relatively open conditions sought by many native species would continue to be absent, setting up conditions for a possible destructive crown fire and a major alteration of the wildlife habitat. Hiding and thermal cover would certainly not be a problem with this alternative, at least not in the short term; in the longer term, a wildfire might occur and greatly reduce the hiding and thermal cover. The desired clumpiness (the occurrence of trees in clumps rather than tending to be relatively even spaced) would tend to decline further as small trees fill in any existing gaps. Kaibab squirrel habitat would decline over time as ponderosa pine habitat is replaced by mixed conifer habitat. Foraging and browsing opportunities would continue to decline for a number of wildlife species, including turkey and mule deer.

The Wildlife Reports in the project record (docs. #114a, #142 and #154) indicate that the vegetative treatments of the Proposed Action would benefit goshawks, their prey species and other species by:

- moving the VSS percentages closer to the desired condition,
- increasing the health and vigor of the stands,
- promoting ponderosa pine regeneration,
- allowing replacement nest stands to grow faster into nest habitat,
- increasing diversity of habitats for prey species,
- maintaining open forest conditions,
- recycling organic matter,
- decreasing fuels,
- maintaining the integrity of the existing hiding cover component,
- enhancing the group-like nature of larger VSS clumps,
- improving Kaibab squirrel habitat,
- enhancing the turkey foraging and nesting habitat,
- and promoting the growth of browse species preferred by mule deer.

Alternative 3 would not provide the benefits bulleted above within old growth stands. It would provide those benefits in stands that are not characterized as old growth. It would provide somewhat less potential for wildlife disturbance and would provide for old growth habitat undisturbed this entry. It would not, however, decrease the fuel loading in the old growth stands and thus not ameliorate the fire risk there and would not provide the understory thinning that would promote the vigor and longevity of the larger trees necessary to maintain old growth stand and group characteristics.

## **B. ACCOMPLISHMENT OF PURPOSE AND NEED**

Disclosure of effects of alternatives should include a comparison of how well the alternatives accomplish the purpose and need of the Proposed Action.

### Move toward the vegetative structural stage distribution needed by northern goshawks and their prey –

Alternative 1 would take no action to move toward the desired VSS distribution. The Environmental Consequences – Vegetation report (doc. #103) concludes that with Alternative 1 “the ability to grow big trees for [the replacement of existing big trees] in the future would be greatly impaired. Young trees in dense groups would not attain the large diameters of current old trees due to extreme competition for moisture, light and nutrients.”

Alternatives 2 and 3 would remove trees to emphasize the target size class (VSS class) and to maintain the health and vigor of the trees. The difference between Alternatives 2 and 3 is that Alternative 3 would not do this in old growth stands.

### Create clumps of trees within larger groups –

Alternative 1 would take no action to increase clumpiness, and tree regeneration and growth would tend to decrease the existing clumpiness.

Alternatives 2 and 3 are designed to increase clumpiness, but Alternative 3 would do so on approximately 2300 acres less than Alternative 2.

### Move toward desired levels of existing dead and live fuels—

Alternative 1 would take no action to reduce the existing, possibly dangerous, fuel loading. Tree growth would tend to increase both the live and dead fuel loading.

Alternatives 2 and 3 would reduce both dead and live fuel loadings by several tons on the average acre, but Alternative 3 would do so on approximately 2300 acres fewer than Alternative 2.

### Reduce the spread rate and severity of wildfires—

Alternative 1 would take no action to reduce the future spread and severity of wildfires.

Alternatives 2 and 3 would reduce stocking on thousands of acres to levels less conducive to a high rate of spread of wildfires and would decrease the severity of most wildfires that might occur. This includes a reduced likelihood of fires spreading from the East Rim area into surrounding forested areas. The alternatives would also take action to maintain and improve fuelbreaks within the East Rim area, and the improved fuelbreaks would also aid in limiting the spread and severity of wildfires.

### Maintain goshawk habitat—

Alternative 1 would take no action to enhance northern goshawk habitat. On the other hand, it would provide no activities that might disturb nesting goshawks.

Alternatives 2 and 3 would take actions to enhance existing northern goshawk habitat. Disturbance would be limited by requirements to do no disturbing activities during the period March 1 to September 30 (see docs. #114a, #142 and #154 for details).

Maintain and enhance old growth characteristics—

See the discussion earlier in this chapter concerning old growth as a significant issue. Alternative 1 would do no treatment to alter old growth characteristics, nor would it do anything to increase growth into old growth tree sizes or to reduce the fire risk to old growth stands.

Alternative 3 is much like Alternative 1 with respect to this criterion. There would be no treatment within identified old growth stands, and so tree growth into old growth size classes would continue to decrease and the fire risk would also increase.

Alternative 2 would remove surplus understory trees in old growth stands, retain the larger trees and reduce the fuel ladders that could otherwise allow fire into the crowns of the larger trees.

Maintain habitat for potential Mexican spotted owls—

Alternative 1 would take no action to enhance Mexican spotted owl habitat. Computer modeling has indicated that, without action, the stands would tend toward stagnancy.

Alternatives 2 and 3 would manage stocking and size distribution in a manner to place certain stands--those identified as among the best 25% on the District as far as potential habitat for MSO--on a trajectory toward target/threshold stand conditions for MSO.

Slightly increase the acreage in ponderosa pine and Douglas-fir—

Alternative 1 would take no action to increase the acreage of the two species, and during a period of years tree growth of other species (natural **succession**) would decrease the existing acreage of ponderosa pine.

Alternatives 2 and 3 would utilize selective thinning, placement of group selection harvests and prescribed burning to maintain and increase the acreage in ponderosa pine and Douglas-fir.

Reduce infection centers for dwarf mistletoe—

Alternative 1 would take no action to reduce the level of infection by dwarf mistletoe. During the coming decades, dwarf mistletoe would increasingly sap the strength of infected trees and infect more and more trees, resulting in a stagnated stand highly susceptible to fire and never even approaching the characteristics that define old growth or goshawk nesting habitat.

Alternatives 2 and 3 would remove dwarf mistletoe infection centers and provide opportunity for a more vigorous and productive forest, including replacement goshawk nest stands.

Maintain roads; close unneeded roads—

Alternative 1 would take no action to reduce the miles of open road, so there would continue to be opportunity for wildlife disturbance, rutting and other soil impacts associated with unmaintained roads.

Alternatives 2 and 3 would close or, more often, re-close many miles of unneeded and unmaintained road. This would allow maintenance efforts to be focused and would reduce impacts to wildlife and soil.

**C. ENVIRONMENTAL EFFECTS**

The planning team evaluated the activities proposed in the East Rim Vegetation Management proposed action and the alternative as to whether they may individually or cumulatively with other activities have significant environmental effects, as referred to in the NEPA regulations 40 CFR 1508.27.

Potential cumulative effects were analyzed by considering the proposed activities in the context of the past, present, and reasonably foreseeable actions in the East Rim Vegetation Management Planning Area and within the larger Arizona 5<sup>th</sup> level watershed #53 (Table 7). Watershed #53 is approximately 191,947 acres and is comprised of Forest Service, Bureau of Land Management, and State of Arizona Lands, of which Forest Service lands comprise approximately 122,547 acres. Approximately 16, 496 acres of the East Rim Vegetation Management Planning Area occur in Watershed #53. Approximately 660 acres of the East Rim Vegetation Management Planning Area occur within Watershed #38. The watershed was used to bound the cumulative effects analysis because the ground disturbing impacts associated with timber harvest are generally limited to the watershed that contains the treatment.

Table 2 summarizes the approximate acres of the past, present and reasonably foreseeable activities (over the next five years) on lands managed by the Forest Service and BLM. Other activities expected to occur include road maintenance and campground maintenance.

**Table 7. Present and Reasonably Foreseeable Activities on Lands within Arizona and adjacent to 5<sup>th</sup> Level Watershed #53.**

Project Type	Project Name and Brief Project Description	Implementation Date or Status
Multiple Timber and Salvage Sales	Multiple timber sales using varying harvest practices: timber and salvage sales have shaped the existing condition in the East Rim Planning Area and are one component of the subsequent need for change.	Past: 1973-1994
Multiple Fires	Multiple fires with varying burn intensities: fires have shaped the existing condition in the East Rim Planning Area and are one component of the subsequent need for change.	Past: 1960-2001
Grazing Allotments	Cattle Grazing on FS and BLM Administered Lands	Present Action
Active Vegetation Management	Dry Park Vegetation Management Project. Project is moving the vegetation closer to the Forest Plan desired condition for MSO habitat, Goshawk habitat, and old growth. Outside the cumulative effects area, but adjacent to the East Rim analysis area.	Present Action
Campground Reconstruction	Demotte Park Campground Reconstruction: Hazard tree removal, fuels reduction, thinning, and expanded group area (adds 5 acres). Project restricted to existing administrative site boundary.	Reasonably Foreseeable

Project Type	Project Name and Brief Project Description	Implementation Date or Status
Fuels Reduction	<p>Apache trout fuels reduction south of East Rim Analysis Area. Will reduce the probability of a catastrophic fire burning into North Canyon and destroying Apache trout habitat.</p> <p>Reduce the probability of a catastrophic fire destroying structures at trailheads and North Rim Country Store.</p>	Reasonably Foreseeable
Vegetation Management	Telephone Hill Vegetation Management Project. Project will move the vegetation closer to the Forest Plan desired condition for MSO habitat, Goshawk habitat, and old growth.	Reasonably Foreseeable
Wildlife Habitat Improvement	Houserock Wildlife Habitat Improvement: PJ treatments to enhance cliffrose production for wildlife. Outside the mixed conifer habitat vegetation type.	Reasonably Foreseeable
Lodge Expansion	Kaibab Lodge Expansion: Replace all existing facilities within the permitted area. Diseased tree removal and fuels reduction. Project restricted to existing impact area.	Reasonably Foreseeable

Fire suppression, road building, timber sales, wildfires, and cattle grazing represent the primary past management activities that contributed to the cumulative effects of the proposed East Rim Vegetation Management project. These activities had a great influence in developing the existing condition in the East Rim Planning area.

Ongoing and future activities within the project area also include harvest of special forest products, dispersed recreation, campground maintenance, concessionaire facility maintenance and road maintenance (Table 7).

The following section summarizes the affected environment and environmental consequences (effects) of the alternatives on the issues discussed above and on other components of the human environment.

The geographic and social extent of the environmental effects of the proposed activities, considered either singly or cumulatively, are limited to the locality on which they occur and to the specific persons interested in the specific resources. No effects or consequences at the regional, national, or global levels were in evidence during the analysis process. Resource-specific areas of analysis and extent of effects (both short and long term) are described in specialist reports in the Project Record at the North Kaibab Ranger District Office.

The severity of effects was viewed in the wider contexts of time and space. Even the beneficial effects of the action alternatives would be only temporary and minor, imitating and enhancing the cycles that occur within an ecosystem. The design of the alternatives and the mitigation measures greatly hedge against undesirable effects.

**Future Forest Conditions**

Forest conditions at 5 years, 20 years and 40 years after treatment are displayed in Table 8. This analysis is based on no other vegetation treatments occurring during the next 40 years.

**Table 8**

**YEAR 5**

<b>Env. Factor</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
Cover Type	Moving toward more MC	Moving toward more PP	Moving toward PP in treated areas
VSS	No movement toward desired condition	Moving toward desired condition	Moving toward desired condition in treated areas

**YEAR 20**

<b>Env. Factor</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
Cover Type	Moving toward more MC	Moving slightly toward MC	Moving somewhat toward MC
VSS	No movement toward desired condition	No movement toward desired condition	No movement toward desired condition

**YEAR 40**

<b>Env. Factor</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
Cover Type	Moving toward more MC	Moving toward more MC	Moving toward more MC
VSS	No movement toward desired condition	No movement toward desired condition	No movement toward desired condition

The reduction in tree density, movement towards ponderosa pine cover types and movement toward the desired VSS condition with any of the action alternatives is only temporary if no other vegetation treatments occur in the next 40 years. After treatment, forest stands would, over time, become denser, and more stands would become dominated by mixed conifer species.

Tree density would continue to increase with Alternative 1, thus tending toward stagnating stands on much of the Planning Area.

Although Table 8 suggests that at year 20 and also year 40 there would be no movement toward the desired VSS condition even with the action alternatives, the VSS structure would still be closer at those points in time with the action alternatives (and best with Alternative 2) than it would be with No Action. Table 9 shows a large-scale view of changes in VSS. The differences would actually be greater for the action alternatives than is shown, because even when the desired percentage is not achieved, there would often be an improved percentage *within* a particular VSS class.

**Table 9**

<b>Vegetative Structural Stage</b>	<b>Desired Percentages</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
VSS 1 = Grass & Tree Seedlings	10%	2 PFAs near or above--4 low; 3 AUs near or above--4 low	5 PFAs near or above--1 low; 4 AUs near or above--3 low	4 PFAs near or above--2 low; 3 AUs near or above--4 low
VSS 2 = Saplings	10%	4 PFAs near or above--2 low; 5 AUs near or above-- 2 low	5 PFAs near or above--1 low; 5 AUs near or above--2 low	4 PFAs near or above-- 2 low; 5 AUs near or above--2 low
VSS 3 = Young Forest	20%	5 PFAs near or above--1 low; 5 AUs near or above--2 low	5 PFAs near or above; 1 low - 5 AUs near or above; 2 low	5 PFAs near or above; 1 low – 5 AUs near or above; 2 low
VSS 4 = Mid-aged Forest	20%	5 PFAs near or above--1 low; 6 AUs near or above--1 low	5 PFAs near or above--1 low; 7 AUs near or above--0 low	4 PFAs near or above--2 low; 6 AUs near or above--1 low
VSS 5 = Mature Forest	20%	4 PFAs near or above--2 low; 6 AUs near or above--1 low	4 PFAs near or above--2 low; 6 AUs near or above--1 low	4 PFAs near or above--2 low; 6 AUs near or above--1 low
VSS 6 = Old Forest	20%	6 PFAs low; 7 AUs low	6 PFAs low; 7 AUs low;	6 PFAs low; 7 AUs low

*Cumulative Effects.* Alternative 1 in combination with such past events as intensive grazing a century ago, fire suppression for many decades and some of the past logging would lead to a densely stocked forest with a much reduced presence of ponderosa pine and probably of Douglas-fir also. The forest would consist largely of great numbers of relatively small trees, and the competition inherent in those numbers would slow and often preclude growth into the larger tree sizes.

The larger the scope in time or geography, the less effect Alternatives 2 or 3 may be seen as having on future forest conditions. They would, however, reduce the fuel loading, especially the great numbers of trees in the understory, and thereby move the forest somewhat closer to the condition of being able to maintain itself with natural fire.

In combination with past, active, and foreseeable timber sales and vegetative management (e.g., Dry Park, Telephone Hill, Apache Trout, and fuels reduction projects), the action alternatives would result in a forest still more dense than appears to have been the case in the pre-settlement forest.

## **Forest Cover Type**

Under Alternative 1 the forest cover type on a large portion of the East Rim area would eventually succeed to mixed conifer. Both aspen and ponderosa pine have been declining in the Planning Area. With Alternative 1, both species would continue to decline, and in the future there would be fewer stands and especially tree groups of both species.

With Alternative 2, both aspen and ponderosa pine would be revitalized; that is, conditions would be created for regeneration of these species. Alternative 3 would also provide regeneration opportunities to the two species, but Alternative 2 would create and maintain the most acres in the ponderosa pine cover type because it would treat the largest acreage. Both action alternatives would encourage aspen to sprout where it is present, but creation of an aspen forest is not expected due to natural succession to conifer forest types. See documents #102, 132, #134 and #141 in the Project Record.

*Cumulative Effects.* (See *Future Forest Conditions* above). In addition, the action alternatives, in combination with such recent timber sales as Dry Park, wildfires such as De Motte and Point, and foreseeable projects such as Telephone Hill, Apache Trout, and multiple fuels reduction projects (Table 7) would provide opportunity for regeneration of ponderosa pine, and that effect might be noticeable for many decades. That is, there may be more ponderosa pine in the Planning Area and the surrounding area than there would have been without such events and management actions. The proposed treatments of the action alternatives, in combination with such things as recent larger wildfires in the Planning Area and timber sales in the general area, would allow the aspen presence to continue in a relatively healthy fashion.

## **Forest Growth**

Alternative 1 would allow continued decreases in individual tree growth. Alternatives 2 and 3 would follow the stocking levels developed in the amended KNFLMP to achieve the desired condition over time. In the foraging areas, the stands after thinning would not be fully stocked, thus additional trees could be added to the stand without reducing the growth on the neighboring trees. In the post-fledging areas, individual tree growth would be less than the maximum potential, with competition between trees beginning. See documents #102, #132, #134 and #141 in the Project Record.

*Cumulative Effects.* Past management—which has included several timber sales in the past few decades, livestock grazing since the late 1800's and active fire suppression for decades—has resulted in a landscape with about 6-10 times the tree density that existed prior to the onset of those actions. Large tree density is also probably higher than it was before logging began, based on a comparison between 1909 reconnaissance and current inventories. Besides the increase in tree density, there has been a related decrease in the abundance of understory plants and an increased risk for catastrophic wildfire, bark beetle mortality and spread of dwarf mistletoe. However, the future foreseeable fuel reduction and vegetation management projects (Table 7) in combination with East Rim should reduce wildlife risk in and around the analysis area.

Table 10 shows the tree density by forest cover type by size class in 1909 and 1990. It indicates several times as many trees (or at least more) in 1990 in all size classes and both forest types as were present in 1909. In much of the area, the tree density (or stocking) has become so great that

competition between trees has slowed individual tree growth, and this is leading to stagnation and increased tree mortality.

**Table 10. Comparison of Diameter Distribution—Trees Per Acre**

<b>Forest Type &amp; Year</b>	<b>&lt;1”</b>	<b>1-4.9”</b>	<b>5-11.9”</b>	<b>12-17.9”</b>	<b>18-23.9”</b>	<b>24”+</b>
Ponderosa Pine 1909	54	53	20.9	12.7	7.7	4.3
Ponderosa Pine 1990	819	93.3	54.7	17.5	10.5	5.4
Mixed Conifer 1909	40	98	25.9	13.6	5.5	2.6
Mixed Conifer 1990	1502	193.1	127	31.1	8.2	3.3

Alternative 1, in combination with other past and future events and actions, would continue the potentially destructive increase in tree numbers and fuel loading in the Planning Area. The action alternatives, in combination with other events and actions, would counteract an appreciable portion of the past events concerning the increased tree stocking and thus reduced forest growth in the Planning area.

**Forest Insects and Disease**

With Alternative 1, dwarf mistletoe would continue to increase and tree densities would continue to increase, thereby increasing the risk of insect and disease outbreaks. The effect of no action would be to allow the existing dwarf mistletoe infection centers to worsen and spread.

Alternative 2 would have the lowest risk of an insect or disease outbreak. This is because this alternative would treat a larger area than would Alternative 3. Alternative 3, would, however, result in decreased risk of insect or disease outbreaks, just not as much of a decrease as with Alternative 2. See documents #102, #132, #134 and #141 in the Project Record.

**TES Plants**

NKRD biologists completed a biological assessment and evaluation for the three Forest Service sensitive plant species that occurred within the East Rim Planning Area in 1996 (Kaibab beardtongue, Kaibab bladderpod, and Kaibab paintbrush - Document #108 in the Project Record). Kaibab beardtongue was removed from the Forest Sensitive Species List (See documents #195, #208, and #209). No other plant species that could occur in the East Rim Planning Area were added to the sensitive species list since 1996.

No effect would occur from the no action and action alternatives for Kaibab Bladderpod. For Kaibab Paintbrush, no effect would occur from the no action alternative (see documents #3, #108 and in the Project Record).

*Cumulative Effects.* The three species mentioned are meadow habitat plants, and there has been a reduction in meadow area acreage over time. The effect of the action alternatives in conjunction with the effects of other timber sales and fires in the Planning Area would be to somewhat counteract the shift from meadow areas to mixed conifer forest.

## **Future Forage Conditions**

### Alternative 1--

- effects at year 1: very little, if any, measurable effects to forage conditions.
- effects at year 5: same as year 1.
- effects at year 10: same as year 1.

### Alternative 2--

- effects at year 1: slight increase in forage vigor, reproduction, and production.
- effects at year 5: moderate increase in vigor, reproduction, and annual production.
- effects at year 10: slight reduction in vigor, reproduction and annual production due to closing of the crown canopy (as compared to year 5).

### Alternative 3--

- effects at year 1: similar to alternative 2 effects at year 1 except no such increases within old growth stands.
- effects at year 5: similar to alternative 2 effects at year 5—without increases within old growth.
- effects at year 10: similar to alternative 2 effects at year 10.

See document #107 in the Project Record.

Either action alternative would, by itself, make only a small improvement in the availability of forage.

*Cumulative Effects.* Alternative 1--in combination with such past events as fire suppression, the increase in mixed conifer stocking and the implementation of the recent Kane Ranch grazing management decision—would continue the pattern of allowing the area to decrease in forage production capability.

The action alternatives, in combination with past fires and past and future timber sales, would somewhat reverse that pattern and allow greater forage production on this part of the Kaibab Plateau, home of the Kaibab mule deer herd.

## **MSO Restricted Areas**

Alternative 1 would allow many stands to move away from threshold conditions because of insects, disease and catastrophic events in the long term.

Subsequent to implementing the treatments proposed in either action alternative, the restricted area stands would continue to meet the nesting/roosting characteristics. A small portion of the District's best 25% MSO nest/roost habitat would be treated, with treatment need based on tree density. Treatments in these stands would move these stands on a more rapid trajectory toward threshold conditions than could be achieved through deferral. The treatments would also reduce the ladder fuels that could quickly carry fire into the crowns of the trees and reduce the acreage and quality of the potential habitat. Long-term (5-20 years) effects of the various treatments would be stands closer to the threshold conditions described in the MSO Recovery Plan and a reduced threat of loss of potential habitat to wildfire. See documents #114, #115, #132, #143 and #154 in the Project Record.

## **Fire And Fuels**

Alternative 1 would continue the current fire exclusion management of the project area. Stand structure would continue to move away from one that is tolerant and resilient to disturbance to a system that is at risk to catastrophic wildfires and increased mortality from insects, disease and drought. This alternative would result in a likelihood of larger and more erratic wildfires; an increased threat to Kaibab Lodge, the North Rim Country Store, East Rim Overlook and De Motte Campground; increased danger to wildland firefighters and greater potential for increased smoke as fuel loads and understory biomass increase.

Under Alternative 1, fuel loadings and tree densities would continue to increase, thereby increasing the risk of large, stand-replacing fires in the East Rim area. This would put lands surrounding East Rim at greater risk since fires could easily burn beyond the boundaries of East Rim.

Under the action alternatives, the risk from large, stand-replacing wildfires occurring in East Rim would be reduced, and this would decrease the risk of stand-replacing fires burning into the lands surrounding East Rim. Two large stand-replacing wildfires have occurred in the East Rim area within the last 20 years, the De Motte Fire in 1977 (1,111 acres) and the Point Fire in 1993 (950 acres within the East Rim Planning Area).

Both action alternatives include prescribed burning. With the action alternatives, fire would have a beneficial effect on recycling nutrients and in providing regeneration opportunities for many plant species. In ponderosa pine stands, low-intensity prescribed fires would maintain a more open stand structure.

Mortality resulting from prescribed burning is anticipated. Many factors can influence tree mortality resulting from prescribed burns such as season of burning, fuel moisture, crown closure, fuel loading and the arrangement of fuel. For trees less than five inches in diameter, the residual tree densities after prescribed burning would be approximately 30% of their pre-burn densities. In mixed conifer this would equate to approximately 650 trees per acre after implementing the burning, and in ponderosa pine this would equate to approximately 400 trees per acre after implementing the burning.

A Forest Service fire effects model (FOFEM) indicated a high probability for mortality in seedling size trees. The probability of mortality decreases considerably as the diameter increases; with the decrease much more rapid for ponderosa pine than for mixed conifer species. The average tree diameter killed by the modeled fire occurrence was 2.3 inches.

Prescribed burning is proposed in only a limited portion of the Planning Area in either action alternative, and the requirements concerning the appropriate time for burning would ensure that the predicted range of tree mortality would not be exceeded.

Either Alternative 2 or Alternative 3 would reduce the size and frequency of stand-replacing wildfires and reduce fuels to an average of 5-7 tons per acres in treated ponderosa pine stands and 10-15 tons per acres in treated mixed conifer stands.

Alternative 2 would reduce the fuel loading on an appreciably larger acreage than would Alternative 3, and thus the Proposed Action would provide for a lower risk of stand-replacing wildfire in the East Rim area than would Alternative 3.

With either action alternative, forest conditions would become more conducive to frequent, low-intensity surface fires. There would also be a reduced risk of mortality in the older trees from crown fires, bark beetles and other agents. The forest stand would move toward a more fire-resistant species (ponderosa pine) and away from fire-intolerant species (firs and spruces). Future wildfires would be smaller and display less erratic fire behavior, resulting in lower costs and decreased difficulty in controlling them. There would also be a decreased threat to Kaibab Lodge, The North Rim Country Store, East Rim Overlook and De Motte Campground. See documents #96 and #104 in the Project Record.

*Cumulative Effects.* Many past actions have contributed to the fuel build-up. The action alternatives, in combination with such recent projects as Dry Park Vegetation Management, would somewhat counteract the trend toward high and higher fuel loadings and reduce the fire risk within the general East Rim area.

The effects of either action alternative, in combination with the treatments in mixed conifer that have been done in recent years or are reasonably foreseeable (Table 7), include retention of dense MSO habitat. Another cumulative effect of the treatments would be reduced likelihood of loss of habitat to large wildfires.

### **Management Indicator Species (MIS)**

Under the National Forest Management Act (NFMA) of 1976, the Forest Service is directed to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives” (Section 6 (g)(3)(B)). Additionally, regulations enforcing the act state that diversity is to be provided by management of fish and wildlife habitat to maintain viable populations of existing native and desired non-native vertebrate species in the planning area (36 CFR 219.19). These regulations require individual Forests to select Management Indicator Species (MIS) whose populations are believed to indicate the effects of land management activities on other species. These indicators are to be identified in a Forest Plan. Population trends are to be monitored, and relationships between populations and habitat changes are to be determined at the *Forest* level.

The Kaibab National Forest completed a forest-wide analysis of the MIS during the spring and summer of 2002 (see document # 196 in the Project Record). This version examines population status of each species and comments on trends. Habitat trends for MIS will be determined through evaluation of the various vegetation types that occur within the Forest. An analysis of habitat status for MIS that occur in forested habitat was also conducted during the spring and summer of 2002 (see document #197 in the Project Record). These documents are dynamic, and will change as new data become available.

The results and conclusions from the East Rim-specific Management Indicator Species (MIS) analysis (See document #198 in the Project Record) are presented below. This analysis evaluates the potential effects of project alternatives on habitat for MIS, given the population trends

identified in the Forest-wide MIS analysis (document #196). This document builds on information provided in the analysis of forested habitat (document #197). Documents #196, #197, and #198 exist in the East Rim Project Record and may be obtained upon request.

The East Rim Vegetation Management project area is within Ecosystem Management Area (EMA) 13. For this EMA, the KNFLMP identifies 14 MIS to represent all wildlife and rare plant species that are present (Table 11). The MIS were chosen to indicate forest health, and each is associated with a particular habitat feature of a given structural (seral) stage within a specific habitat type. All Ecosystem Management Area 13 MIS do not occur within the East Rim project area, because not all of these MIS have suitable habitat within the project area. Table 11 lists the MIS, their associated seral stage and habitat type, and identifies which species are known to be present or have suitable habitat within the project area. See document # 197 in the Project Record for rationale for selecting species and a more detailed description of the habitat each was chosen to represent.

**Table 11. Management indicator species of the Kaibab National Forest for Ecosystem Management Area 13, the habitat they were chosen to represent, and presence of habitat within the East Rim project area.**

<i>Management Species</i>	<i>Indicator</i>	<i>Habitat Type<sup>1</sup></i>	<i>Habitat Present</i>
Aquatic macroinvertebrates		Riparian	
<b>Birds</b>			
Goshawk		Late-seral ponderosa pine	Yes <sup>4</sup>
Hairy woodpecker		Snags in ponderosa pine, mixed conifer and spruce-fir	Yes
Lincoln's sparrow		Late-seral, high elevation (>7,000') riparian	
Lucy's warbler		Late-seral, low elevation (<7,000') riparian	
Juniper (Plain) titmouse <sup>2</sup>		Late-seral pinyon-juniper, and snags in pinyon-juniper	
Pygmy nuthatch		Late-seral ponderosa pine	Yes
Spotted owl		Late-seral mixed conifer and spruce-fir	Yes
Turkey		Late-seral ponderosa pine	Yes
Red-naped sapsucker <sup>3</sup>	(Yellow-bellied)	Late-seral aspen and snags in aspen	Yes
Yellow-breasted chat		Late-seral, low elevation (<7,000') riparian	
<b>Mammals</b>			
Mule deer		Early-seral aspen and pinyon-juniper	Yes
Red squirrel		Late-seral mixed conifer and spruce-fir	Yes
Tassel-eared squirrel		Early-seral ponderosa pine	Yes

<sup>1</sup>See document #197 in the Project Record for a complete description of habitat and rationale for MIS selection.

<sup>2</sup>The plain titmouse was split into two species: the oak titmouse along the west coast and the juniper titmouse (*Baeolophus ridgwayi*) in the Southwest <sup>3</sup>(Sibley 2000).

<sup>3</sup>The yellow-bellied and red-naped sapsucker are very closely related, forming a cline from more red and less white in the west to less red and more white in the east. (Sibley 2000).

<sup>4</sup>No discussion will follow for species that do not exist or have habitat in the East Rim project area.

**Analysis Methods:** In order to determine potential effects of treatment alternatives on MIS in the East Rim Vegetation Management Area, stands were first selected as examples for analysis. Important MIS habitat variables were then selected in each forest cover type. Next, features were quantified in these example stands. Finally, these data were used to model current stand

<sup>a</sup> Sibley, D.A. 2000. The Sibley Guide to Birds. Alfred A. Knopf, New York.

conditions and future conditions based on treatment alternatives (see document # 198 in the Project Record for a complete discussion of analysis methods).

**Alternative Comparisons:** Under the No Action alternative, no vegetation treatments would occur in the project area. Both action alternatives have the same prescriptions being implemented on the project area. However, they differ in the number of acres treated. A greater number of acres would be treated under Alternative 2 than Alternative 3.

The following summarizes the predicted effects of alternative treatments on habitat characteristics within the project area. See document #198 in the Project Record for the complete analysis and data tables. Potential effects of the No Action alternative, Alternative 2, and Alternative 3 are discussed and evaluated with respect to MIS.

### **Early-seral Aspen**

*No Action Alternative:* Modeling of short-term effects on the aspen component of mule deer habitat under the No Action alternative showed a slight increase in SDI and decrease in density of young aspen trees. Long-term effects for these stands showed the same trend.

*Action Alternatives:* Modeling of short-term effects on the aspen component of mule deer habitat under the Action alternatives showed a large increase in SDI and density of young aspen trees. Long-term effects on these stands showed a reduction in SDI and density of young trees, however it is still much greater than under the no action alternative. Overall, the Action alternatives should increase the amount of early-seral aspen within the East Rim area.

Alternative 2 treats more acres of aspen than Alternative 3 (294 acres regeneration/thin; 124 acres thin). Thus, the general trend of increased early-seral aspen would be greater in Alternative 2 than 3.

*Conclusion:* Given the possible decline of early- and late-seral aspen at the Forest level (document #197), encouragement of aspen regeneration should increase suitable habitat for aspen dependent species such as mule deer. All alternatives show an increase in early-seral aspen, however the action alternatives show a much greater increase in this habitat component.

### **Late-seral Aspen**

*No Action Alternative:* Modeling of short-term effects on the late-seral aspen component of red-naped sapsucker habitat under the No Action alternative showed little change in aspen snags in all forest types, and very slight increases in tpa and SDI for aspen trees, and snags in aspen. Long-term effects for these stands showed the same trend.

*Action Alternatives:* Modeling of short-term effects on the late-seral aspen component of red-naped sapsucker habitat under the Action alternatives showed a greater increase in aspen snags in all forest types and snags in aspen, but a decrease in tpa and SDI of mature aspen trees. Long-term effects on these stands showed a much greater increase in aspen snags in all forest types, however tpa and SDI of mature aspen trees is lower than under the no action alternative. Short-term increases in snags in aspen drop back down to numbers similar to the no action alternative in the long-term. Alternative 2 treats more acres of aspen than Alternative 3 (294 acres regeneration/thin; 124 acres thin). Thus, the general trend of increased aspen snags would be greater in Alternative 2 than 3. However, increases in early-seral aspen will be offset by decreases in late-seral aspen under both action alternatives. This would be greater under

Alternative 2 than 3. However, 51.5 % under Alternative 2 and 65.0% under Alternative 3 of the project area would remain untreated. These untreated areas would retain numbers of snags and mature aspen trees similar to modeling results for the No Action Alternative.

*Conclusion:* Given the possible decline of early- and late-seral aspen at the Forest level (document #197), encouragement of aspen regeneration and growth into large size classes should increase suitable habitat for aspen dependent species such as red-naped sapsucker. The no action alternative does little to improve these habitat features. The action alternatives show improvement in late-seral aspen habitat.

### **Late-seral Mixed Conifer**

*No Action Alternative:* Modeling of short-term effects on the late-seral mixed-conifer habitat for red squirrel under the No Action alternative showed a general increase in SDI and tpa for mature trees. Long-term effects appeared to continue this trend.

*Action Alternatives:* Modeling of short and long-term effects on the late-seral mixed conifer habitat under the Action alternatives also showed a general increase in SDI and tpa for mature trees. This is slightly less than under the no action alternative. Alternative 2 treats more acres of white fir forest type within the mixed conifer than Alternative 3. This may result in slightly lower numbers of mature trees in the mixed conifer under Alternative 2 (61.5%) than under Alternative 3 (33.5%).

*Conclusion:* Late-seral mixed conifer at the Forest level appears to be stable, and possibly increasing since 1987 (document #197). Management entries into the mixed conifer that follow the Amended Forest Plan should benefit mixed conifer dependent species such as the red squirrel by diversifying the forest structure while retaining the large diameter component. The No Action Alternative appears to maintain slightly greater numbers of large diameter trees, but this may not be substantially different from the Action alternatives.

### **Early-seral and Mid- to Late-seral Ponderosa Pine**

*No Action Alternative:* Modeling of short-term effects on the early-seral ponderosa pine habitat for tassel-eared squirrel under the No Action alternative showed a general decrease in SDI and tpa for young trees. Long-term effects appeared to continue this trend. Given that tassel-eared squirrel habitat is more in the mid- to late-seral stage, we have included it in this analysis. Modeling of short- and long-term effects on the mid- to late-seral ponderosa pine habitat under the No action alternative showed a generally increasing trend in SDI and tpa for medium to large trees.

*Action Alternatives:* Modeling of short- and long-term effects on the early-seral ponderosa pine habitat under the Action alternatives showed a dramatic decrease in SDI and tpa for young trees. Short- and long-term effects on mid- to late-seral ponderosa pine showed a generally decreasing trend in SDI and tpa for medium to large trees. Alternative 2 treats slightly more area within ponderosa pine than Alternative 3 (56.4 vs. 46.2%). The remaining, untreated ponderosa pine portions of the project area (Alt 2 43.6%; Alt 3 53.8%) should show slight decreases young trees in the short- and long-term similar to the no action results. This would continue to provide for early-seral ponderosa pine habitat over approximately half of the ponderosa pine.

*Conclusion:* Early-seral ponderosa pine at the Forest level appears to be increasing since 1987 (document #197). Management entries that follow the Amended Forest Plan should benefit ponderosa pine dependent species such as the Kaibab squirrel by diversifying the forest structure while retaining trees in all diameter classes.

### **Forage in Ponderosa Pine**

*No Action Alternative:* Modeling of the forage habitat in ponderosa pine for wild turkey under the No Action alternative showed an increase in SDI in the short-term, then a slight decrease in the long-term. Modeling showed a marginal decrease in the index of forage production in both the short- and long-term.

*Action Alternatives:* Modeling of short-term effects of the forage habitat under the Action alternatives showed a dramatic increase in SDI, then decrease in the long-term. Modeling of the index of forage production showed a slight increase in the short-term, then a decrease back to year 2000 levels. Forage production levels under the action alternatives were higher than under the no action alternative. Alternative 2 treats slightly more area within ponderosa pine than Alternative 3 (56.4% vs. 46.2%), creating more areas of higher forage production than Alternative 3. The remaining, untreated ponderosa pine portions of the project area (Alt 2 43.6%; Alt 3 53.8%) should show slight decreases in the short- and long-term similar to the no action results.

*Conclusion:* Tree densities in general have increased at the Forest level since 1987 (document #197). Management entries that follow the Amended Forest Plan should benefit ponderosa pine dependent species such as the wild turkey by diversifying the forest structure while retaining trees in all diameter classes. Modeling showed little difference in forage habitat between action and no action alternatives. However, given the small size of the openings created under current management, this method of modeling may not be able to detect such differences. Treatments in previous areas (Lookout Canyon, Lost Canyon) have shown increases in grasses, forbs and especially shrubs after treatment.

### **Late-seral Ponderosa Pine**

*No Action Alternative:* Modeling of short-term effects on the late-seral ponderosa pine habitat for goshawk, hairy woodpecker, pygmy nuthatch and wild turkey under the No Action alternative showed a general increase in SDI and tpa for mature trees. Long-term effects appeared to continue this trend.

*Action Alternatives:* Modeling of short- and long-term effects on the late-seral ponderosa pine habitat under the Action alternatives showed a slight increase in SDI and tpa for mature trees in the short-term, then a decrease to close to year 2000 estimates. Estimates for the no action and action alternatives are very similar for both SDI and tpa. Alternative 2 treats slightly more area within ponderosa pine than Alternative 3 (56.4% vs. 46.2%). The remaining, untreated ponderosa pine portions of the project area (Alt 2 43.6%; Alt 3 53.8%) should show increases in the short- and long-term similar to the no action results.

*Conclusion:* Late-seral ponderosa pine at the Forest level appears to be stable, but there may have been declines in the very large size class trees since 1987. For example, on the Kaibab Plateau there are more ponderosa pine in the 18 to 24 inch dbh size-class than there were

historically but fewer trees greater than 24 inches dbh (document #197). Therefore, management entries into the ponderosa pine that follow the Amended Forest Plan should benefit ponderosa pine dependent species such as the goshawk, hairy woodpecker, pygmy nuthatch and wild turkey by diversifying the forest structure while retaining the large diameter component. The no action alternative appears to maintain slightly higher numbers of large diameter trees, but this may not be substantially different from the Action alternatives. Much of the losses in trees  $\geq 12$  inch diameter in the mid- to late-seral stage modeling in the previous section appear to be in the mid-seral (12-17.9 inch dbh) size range.

### **Late-seral Mixed Conifer and Spruce-fir**

*No Action Alternative:* Modeling of short-term effects on the late-seral mixed conifer and spruce-fir habitat for spotted owl under the No Action alternative showed a general decrease in the 12-18" size class (2.1%), 18-24" size class (0.7%) and >24" size class (0.2%), but an increase in large trees ( $\geq 18$ "; +5.5 tpa) and stand BA (+26.7 ft<sup>2</sup>). Long-term effects appeared to continue the trend in large trees and stand BA, however size class distribution takes a slight upturn with increases in 12-18" size class (1.2%), 18-24" size class (0.6%) and >24" size class (0.2%). The No Action alternative does little to improve the desired condition for size class distribution for MSO habitat; and stand BA is well above stand minimums per the recovery plan.

*Action Alternatives:* Modeling of short-term effects on the late-seral mixed conifer and spruce-fir habitat under the Action alternatives showed a decrease in 12-18" dbh trees (0.1%), but increases in 18-24" (0.5%) and >24" (0.3%) dbh trees, tpa of large trees (+3.0 tpa) and stand BA (+22.2 ft<sup>2</sup>). Long-term effects show a continued increase in large trees (+1.3 tpa) and distribution of trees >24" (0.2%); but decrease in BA (-11.4 ft<sup>2</sup>), distribution of 12-18" (0.3%), and 18-24" (0.5%) trees. All of these changes are very slight, but do tend toward increases in greater numbers of larger diameter trees. Alternative 2 treats approximately 1352 more acres within Mexican spotted owl habitat than Alternative 3. The remaining untreated spotted owl habitat for the project area (Alt 2 approx. 3096 acres; Alt 3 approx. 4448 acres) should show short- and long-term increases similar to the no action results.

*Conclusion:* Late-seral mixed conifer and spruce fir make up only a small percent of the Forest, and have experienced very limited management at the Forest Level (document #197). The main threat to this habitat is catastrophic fire. Management entries into the mixed conifer and spruce-fir that follow the Amended Forest Plan should benefit dependent species such as the Mexican spotted owl by diversifying the forest structure and reducing ladder fuels while retaining the large diameter tree component. The no action alternative appears to maintain slightly greater numbers of large diameter trees, but this may not be substantially different from the Action alternatives.

### **Snags in Ponderosa Pine and Mixed Conifer**

*No Action Alternative:* Modeling of short- and long-term effects on the snag component of ponderosa pine and mixed conifer habitat for hairy woodpecker under the No Action alternative showed a slight increase in snags over time.

*Action Alternatives:* Modeling of short- and long-term effects on the snag component of ponderosa pine and mixed conifer habitat under the Action alternatives showed a much greater

increase in snags in both the short and long term. Alternative 2 treats 454 more acres of ponderosa pine and 1309 more acres of white fir than Alternative 3; therefore Alternative 2 would create greater numbers of snags throughout the project area than Alternative 3.

*Conclusion:* The snag component at the Forest level appears to be stable, and possibly increasing since 1987 (document #197). Management entries into the ponderosa pine and mixed conifer that follow the Amended Forest Plan should benefit snag dependent species such as the hairy woodpecker by diversifying the forest structure while retaining snags, reserve trees to grow into future green and dead snags, and the large diameter tree component of these habitats. The action alternatives appear to create much greater numbers of snags in the long term, but this may be due to the recruitment of aspen and the aspen snag component discussed earlier.

**Summary Table:** Table 12 presents a summary of the MIS analysis for the East Rim project area. Predicted effects of the No Action and action alternatives are provided for each species. These predictions are based on existing habitat conditions, MIS population trends, and analyses identified in the Forest-wide and East Rim project-specific MIS reports (documents #196, #197, and #198).

**Table 12. MIS Summary Table.**

<i>Management Indicator Species</i>	<i>Habitat Feature</i>	<i>Existing Condition</i>	<i>No Action Alternative</i>		<i>Action Alternatives</i>	
			<i>Short-term</i>	<i>Long-term</i>	<i>Short-term</i>	<i>Long-Term</i>
Goshawk	Late-seral Ponderosa pine	18.3 tpa <i>mature ponderosa pine</i> 67.0 SDI	+	+	+	+
Hairy woodpecker	Snags (ponderosa pine & mixed conifer)	7.3 <i>snags/acre</i>	+	+	+	++
Pygmy nuthatch	Late-seral Ponderosa pine	<i>See goshawk</i>				
Spotted owl	Late-seral Mixed conifer & spruce-fir	23.0 tpa <i>mature trees</i> ; 193.5 ft <sup>2</sup> BA; 12.3% <i>trees 12-18" dbh</i> ; 2.9% <i>trees 18-24" dbh</i> ; 1.4% <i>trees &gt;24" dbh</i>	+	+	+	+
Turkey	Late-seral Ponderosa pine, Forage	<i>See goshawk</i> 12.9 index of forage	-	-	+	-
Red-naped sapsucker	Late-seral aspen, Snags	4.0 aspen <i>snags/acre</i> ; 30.2 tpa <i>mature aspen</i> ; 2.8 <i>large snags/acre</i> in aspen	+	+	++	+
Mule deer	Early-seral aspen	919.2 tpa <i>young aspen</i> 78.0 SDI	-	-	++	+
Red squirrel	Late-seral Mixed conifer	23.2 tpa <i>mature trees</i> 75.8 SDI	+	+	+	-
Tassel-eared squirrel	Early-seral Ponderosa pine	41.5 tpa <i>young ponderosa pine</i> 20.3 SDI	-	-	--	--

<b>Management Indicator Species</b>	<b>Habitat Feature</b>	<b>Existing Condition</b>	<b>No Action</b>		<b>Action Alternatives</b>	
			<b>Short-term</b>	<b>Long-term</b>	<b>Short-term</b>	<b>Long-Term</b>
Tassel-eared squirrel	Mid- to late-seral ponderosa pine	30.0 tpa <i>medium to large ponderosa pine</i> 41.5 SDI	+	-	-	-

*Cumulative Effects.* Besides the direct and indirect effects described above of implementing the alternatives, other similar activities have taken place in the past and are proposed for the future (Table 7). The most similar activities are the active Dry Park Timber Sale (for the purpose of goshawk habitat management) and the foreseeable Apache Trout (for fuels reduction) and Telephone Hill (for the purpose of goshawk habitat management) projects. Although the active Dry Park Timber Sale is outside the cumulative effects analysis area, it is adjacent to the East Rim analysis area. Vegetation and fuels treatments might take place in both the Dry Park and East Rim areas during the same general period of time, so the short-term effects described above could cover a larger area. Given the amount of area involved, disturbance activities could not only affect individual birds but also, through such responses as reduced reproduction, temporarily affect population levels. Long-term effects would also happen over a larger area. The long-term effects are expected to be positive, including an increase in diversity of habitats and enhancement of ponderosa pine and mixed conifer habitats.

### **Migratory Birds**

The North Kaibab Ranger District is used by hundreds of different species of migratory birds for breeding, migration or wintering habitat (see document #199 in the East Rim Project Record for a complete discussion of migratory bird status on the Kaibab National Forest). It would be an impossible task to quantify and analyze the current condition and effects of management on all of these species. We utilize the Arizona Partner’s in Flight (<sup>b</sup>APIF; <sup>c</sup>Latta et. 1999) priority species concept for our analysis. APIF selected priority species for each habitat type in Arizona to represent a suite of associated species, discussed habitat and population objectives, and management issues and recommendations. For more details on this process see Latta et. al 1999.

The East Rim project area contains areas of spruce-fir, mixed conifer, aspen and ponderosa pine habitats, as defined in APIF. We utilized fourteen species for our analysis (Table 13).

<sup>b</sup> Arizona Partner’s in Flight.

<sup>c</sup> Latta, M.J., C.J. Beardmore, and T.E. Corman. 1999. Arizona Partners in Flight Bird Conservation Plan. Version 1.0. Nongame and Endangered Wildlife Program Technical Report 142. Arizona Game and Fish Department, Phoenix, Arizona. Available: [http://www.blm.gov/wildlife/plan/pl\\_az\\_10.pdf](http://www.blm.gov/wildlife/plan/pl_az_10.pdf)

**Table 13. Arizona Partner’s in Flight Priority Species for Habitats Within the East Rim Project Area.**

Habitat	Priority Species	Associated Species
Spruce-Fir	Swainson’s Thrush	Red-naped sapsucker, three-toed woodpecker, gray jay, mountain chickadee, house wren, hermit thrush, American robin, dark-eyed junco, pine grosbeak, red crossbill, pine siskin
	Pine Grosbeak	northern saw-whet owl, broad-tailed hummingbird, gray jay, clark’s nutcracker, red-breasted nuthatch, ruby-crowned kinglet, American robin, dark-eyed junco, red crossbill, pine siskin
	Golden-crowned Kinglet	red-naped sapsucker, Steller’s jay, mountain chickadee, red-breasted nuthatch, rugy-crowned Kinglet, hermit thrush, yellow-rumped warbler, dark-eyed junco, pine siskin, red crossbill
	Three-toed woodpecker	hairy woodpecker, northern flicker, olive-sided flycatcher, violet-green swallow, brown creeper, house wren, hermit thrush, dark-eyed junco
Mixed Conifer	Northern Goshawk	wild turkey, flammulated owl, Williamson’s sapsucker, northern flicker, Stellar’s jay, pygmy nuthatch ,western bluebird, American robin, solitary vireo, Grace’s warbler, western tanager, red crossbill
	Mexican spotted owl	northern goshawk, whiskered screech-owl, whip-poor-will, Strickland’s woodpecker, Virginia’s warbler, red-faced warbler, painted redstart, hepatic tanager
	Olive-sided Flycatcher	Flammulated owl, Williamson’s sapsucker, purple martin, violet-green swallow, pygmy nuthatch, Grace’s warbler
Aspen	Red-napped sapsucker	warbling vireo, tree swallow, violet-green swallow, downy woodpecker, evening grosbeak, broad-tailed hummingbird, blue grouse, house wren, yellow-rumped warbler, orange-crowned warbler, American robin, hermit thrush, northern saw-whet owl
Ponderosa Pine	Northern Goshawk	wild turkey, flammulated owl, Mexican spotted owl, Williamson’s sapsucker, northern flicker, Steller’s jay, pygmy nuthatch, western bluebird, American robin, solitary vireo, Grace’s warbler, western tanager, red crossbill
	Olive-sided Flycatcher	Flammulated owl, Williamson’s sapsucker, purple martin, violet-green swallow, pygmy nuthatch, Grace’s warbler
	Cordilleran Flycatcher*	red-faced warbler, painted redstart, <u>hermit thrush</u> , MacGillivray’s warbler
	Purple Martin	American kestrel, Lewis’ woodpecker, olive-sided flycatcher, tree swallow, violet-green swallow, pygmy nuthatch, western bluebird, mountain bluebird
High Elevation Grassland	Swainson’s Hawk	mountain plover, golden eagle, northern harrier, American kestrel, prairie falcon, mourning dove, burrowing owl, common nighthawk, Say’s phoebe, horned lark, common raven, loggerhead shrike, vesper sparrow, lark sparrow, eastern meadowlark, western meadowlark
	Ferruginous Hawk	mountain plover, golden eagle, northern harrier, American kestrel, prairie falcon, mourning dove, burrowing owl, common nighthawk, Say’s phoebe, horned lark, loggerhead shrike, vesper sparrow, lark sparrow, eastern meadowlark, western meadowlark, common raven
	Burrowing Owl*	Ferruginous hawk, golden eagle, prairie falcon, horned lark, common raven, loggerhead shrike, lark sparrow, black-throated sparrow, sage sparrow, eastern meadowlark, western meadowlark
	Grasshopper sparrow*	Northern harrier, Swainson’s hawk, Sprague’s pipit, <u>Baird’s sparrow</u> , Cassin’s sparrow (wintering), savannah sparrow, chestnut-collared longspur (wintering), McCown’s longspur (wintering), eastern meadowlark

\* Priority Species not found on NKR. Alternate species shown in underline.

The cordilleran flycatcher and grasshopper sparrows are not found in northern Arizona. We will instead use hermit thrush and Baird’s sparrow.

## Methods

Analysis of Migratory bird habitat for the East Rim project was conducted using two data sets: the KNF vegetation database (FSVEG) for breeding season habitat and the Southwest Wildlife Information System (SWIS; Version 8) for overwintering habitat. The KNF vegetation database is a very large database containing information on the vegetation characteristics of stands throughout the Forest. SWIS (Version 8) is an ArcView application that was developed by Bryce Rickle (Southwestern Region, FS) to provide field personnel an easy way to search, query and analyze basic information on wildlife species habitat relationships. Sources for the different taxa lists come from Forest lists (occurrence), BISON-M and R3HARE (habitat relationships databases). At the Forest Level, General Terrestrial Ecosystem (GTES) units are used for habitat mapping units (<sup>d</sup>Carleton et. al, 1991). The general breeding habitat analysis process was to: 1) select example stands from the East Rim area, and 2) model (using FVS) current, short-term and long-term conditions for all habitat variables by habitat type. See document #200 in the East Rim Project Record for a complete discussion of migratory bird effects and analysis methods.

Population trend data was queried from the Breeding Bird Survey Data (<sup>e</sup>Sauer et. al 2001) for the Western BBS Region, the Four Corners Region (Arizona, Utah, New Mexico and Colorado), and the state of Arizona. See the Forest Migratory Bird report (Document #199) for details. As discussed in the Forest Migratory Bird report, except for those species that are also considered MIS (northern goshawk, Mexican spotted own and red-naped sapsucker), there are no Forest or District population trend data available.

## Effects

Effects of the various alternatives will be compared by the amount of area treated and by the effects of those treatments. Alternative 1 (No Action) conducts no vegetation treatments for the area, and thus has no acres treated. However, there are still changes to the habitat through time. Alternatives 2 and 3 (Action Alternatives) use the same basic treatments, but number of acres treated changes. Therefore, projected effects due to the various treatments will be described for both Action Alternatives using the example stands, and then comparisons made of acres treated.

### Spruce-fir

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<sup>d</sup> Carleton, Owen, J; Gass, Jimmy; Brown, Gassaway, III; Spann, Charles, Lang; Robertson, George; Robbie, Wayne A.; Robison, Tom; Moir, William, H; Potter, Debby; Fletcher, Reggie; Galeano-Popp, Renee and Greg Miller. 1991. General Ecosystem Survey. USDA Forest Service, Southwestern Region, Albuquerque, NM. 182 pps. plus tables and maps.

<sup>e</sup> Sauer, J.R., J.E. Hines, and J. Fallon. 2001. The North American Breeding Bird Survey, Results and Analysis 1966 – 2000. Version 2001.2, USGS Patuxent Wildlife Research Center, Laurel, MD. Available: <http://www.mbr-pwrc.usgs.gov/bbs/bbs2001.html>.

The East Rim area contains approximately 3,134 acres of spruce-fir. Alternatives 2 and 3 treat approximately 2,114 acres (67.4%) and 1,621 acres (51.7%) respectively, with the difference occurring in 100 additional acres of regeneration and thinning in Alternative 2.

#### Swainson's Thrush

Under the No Action Alternative, the shrub and forb component of the spruce-fir habitat are predicted to continue to decrease in the short (2010) and long (2020) term with continued decreases in the Index of forage. Under the Action Alternatives, the shrub and forb component of the spruce-fir habitat are predicted to have a slight increase in the short term, then slight decrease again in the long term. Overall, index of forage levels are higher under the Action Alternatives than under the No Action Alternative. Treatments will increase the available shrub and forb component of Swainson's thrush habitat over 67.4% (Alt 2) or 51.7% (Alt 3) of the East Rim area.

#### Pine Grosbeak

Under the No Action Alternative, modeling indicates a continued increase in large Englemann spruce trees, and canopy cover in the short and long term. The index of dispersion shows that the stands remain highly heterogeneous in diameter sizes. Under the Action Alternatives, modeling indicates a continued increase in large Englemann spruce trees in the short and long term. Canopy closure decreases in the short term, then increases again in the long term, but slightly more open than under the No Action Alternatives. Stands remain highly heterogeneous in diameter sizes. All alternatives maintain canopy cover above that recommended (<40%) in APIF. The action alternatives predict slightly fewer large Englemann spruce (0.2 per acre at year 2010 and 0.6 per acre at year 2020) over 67.4% (Alt 2) or 51.7% (Alt 3) of the East Rim area. This difference is probably well within the errors of our model predictions, and is probably not substantially different between the no action and action alternatives.

#### Golden-crowned Kinglet

Under the No Action Alternative, modeling indicates a continued increase in large spruce trees and canopy cover in the short and long term.

Under the Action Alternatives, modeling indicates a continue increase in large spruce trees in the short and long term, although slightly less than under the No Action Alternative. See canopy closure discussion above for this species as well.

All alternatives maintain canopy cover above that recommended (<40%) in APIF. The action alternatives predict slightly fewer large spruce trees (0.2 per acre at year 2010 and 0.8 per acres at years 2020) over the treatment areas. This difference is probably well within the errors of our model predictions, and is probably not substantially different between the no action and action alternatives.

#### Three-toed woodpecker

Under the No Action Alternative, modeling indicates a slight increase in large snags and continued increase in very large trees in the short and long term. No areas had predictions of Dwarf Mistletoe Ratings greater than 4.

Under the Action Alternatives, modeling indicates a great increase in large snags in the short term, then slight decrease in the long term. Modeling also indicates a continued increase in very large trees in the short term, but no additional gain in very large trees for the long term. Long term large snag and very large tree numbers are still higher under the action alternatives than the no action alternative. No areas had predictions of Dwarf Mistletoe Ratings greater than 4. All alternatives maintain large snag and very large tree components in the spruce-fir habitat. The Action Alternatives predict slightly higher numbers of both snags (5.4 per acre at year 2010, and 0.6 per acre at year 2020) and very large trees (1.4 per acre at year 2010, and 1.2 per acre at year 2020).

#### Mixed Conifer

The East Rim area contains approximately 4,799 acres of mixed conifer. Alternatives 2 and 3 treat approximately 61.3% and 33.8% acres respectively, with 880 additional acres of regeneration and thinning, and 440 additional acres of thinning in Alternative 2.

#### Northern Goshawk

Under the No Action Alternative, modeling indicates a continued increase in number and SDI of large trees, and large down logs, and continued decrease in the shrub and forb component in the short and long term. We do predict a slight increase in large snags in the short term, but no additional increase in the long term.

Under the Action Alternatives, modeling indicates a continued increase in number and SDI of large trees, and large down logs. There appears to be a continued decrease in the shrub and forb component in the short long term, however there is a slight increase in the long term. We predict an increase in large snags in the short term, then a decrease in the long term.

All alternatives maintain the mature forest character of the area. The Action alternative predicts slightly less large trees in the short (2.5 per acre) and long (7.2 per acre) term, but is an increase from current. The Action alternatives predict greater numbers of snags in the short and long term. Large down log predictions are very similar for all alternatives. Shrub and forb component prediction shows no improvement for any of the alternatives in the short term. The action alternatives do show a slight improvement in the long term.

#### Mexican Spotted Owl

Under the No Action Alternative there is a continued increase in densities of mid-sized, large and very large conifer trees in the short and long term, however percentages decline for all the groups in the short term. Long term, the large and very large conifer percentages increase slightly.

Treatments in Mexican spotted owl Restricted stands follow the Mexican spotted owl Recovery Plan for the development of silvicultural prescriptions (<sup>f</sup>USDI 1995). Under the Action Alternatives there is a predicted slight decrease in densities of mid-sized, large and very large conifer trees in the short term, however a slight increase in densities of very large trees in the

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<sup>f</sup> USDI Fish and Wildlife Service. 1995. Recovery Plan for the Mexican spotted owl (*Strix occidentalis lucida*). Albuquerque, NM

long term. Percentages decrease slightly for mid-sized for the short and long term, however large conifer trees show an increase in the short term and very large conifer trees show an increase in the short and long term. Densities of all large trees ( $\geq 18''$  dbh) continue to increase. Stand BA increases short term, however declines slightly in the long term, but remains well above the desired minimums.

All alternatives maintain the mature forest character of the area, however the Action alternative move treated stands on a faster trajectory toward Threshold conditions by bringing the percentage balance of large and very large trees closer together.

#### Olive-sided Flycatcher

Under the No Action Alternative, modeling indicates a continued slight increase in openings, and very large trees in the short and long term. A change is predicted for a slight increase in large snags in the short term, but no additional increase in the long term. Stands continue to maintain the highly heterogeneous nature in diameter sizes with an index of dispersion  $< 0.01$  for all stands.

Under the Action Alternatives, modeling indicates a similar increase in openings and very large trees in the short and long term. We predict a greater increase in large snags in the short term, then a decrease in the long term.

All alternatives maintain the mature and snag characters of the area. The Action alternative predicts slightly more very large trees in the short term (0.2 per acre) but slightly less in the long term (0.2 per acre). The Action alternatives predict greater numbers of snags in both the short (+4.0 per acre) and long (+0.6 per acre) term.

#### Aspen

The East Rim area contains approximately 2,382 acres of aspen. Alternatives 2 and 3 treat approximately 22.4% and 4.9% acres respectively with 293 additional acres of regeneration and thinning, and 124 acres of thinning in Alternative 2.

#### Red-naped sapsucker

Under the No Action Alternative, modeling for all coniferous forest types indicates a continued increase in large aspen in the short term, but slight decrease in the long term. Numbers of aspen snags remains relatively stable over the short and long term. In aspen forest type, numbers of large aspen snags changes to increasing in both the short and long term. Distribution of size classes of aspen trees appears to remain dominated by the smaller size classes in both the short and long term, with only very small ( $< 7\%$ ) proportion in the mid- to large-sized aspen trees.

Under the Action Alternatives, modeling for all coniferous forest types indicates a trend of decreasing large aspen in the short and long term. However, numbers of aspen snags change to a large increase in the short term and very large increase in the long term. In aspen forest type, numbers of large aspen snags changes to a large increase in the short term, but a decrease in the long term. Distribution of size classes of aspen trees appears to remain dominated by the smaller size classes, with small decreases in the proportion of mid- to large-sized aspen trees in the short term, and a slight increase in the long term.

All alternatives retain the mature aspen character of the area. The Action alternative predicts in all forest types decreases in large aspen in the short (-18.4 per acre) and long (-21.8 per acre) term, however large increases in aspen snags in the short (+15.6 per acre) and long (+202.2) term. In aspen stands, the action alternative predicts larger increases of large snags in the short term (+8.0 per acre) but slightly less in the long term (-1.2 per acre). None of the alternatives move aspen stands to a better balance of size classes, with stands characterized by a large proportion in the smaller size classes. Given the greater proportion of the small diameter aspen trees, longer time may be needed to make changes in the size class distribution.

#### Ponderosa Pine

The East Rim area contains approximately 4,791 acres of ponderosa pine. Alternatives 2 and 3 treat approximately 56.4% and 46.2% acres respectively, with 258 additional acres of regeneration and thinning, 14 additional acres of sanitation/salvage, and 212 additional acres of thinning in Alternative 2.

#### Northern Goshawk

Under the No Action Alternative, modeling indicates a continued increase in number and SDI of large trees, and large down logs, and continued decrease in the shrub and forb component in the short and long term. We do predict a slight increase in large snags in the short term, but a decrease in the long term.

Under the Action Alternatives, modeling indicates a continued increase in SDI of large trees, and large down logs in the short and long term. Numbers of large trees appear to remain stable in both the short and long term from current conditions. There appears to be a change to an increase in the shrub and forb component in the short long term, however returns to current levels in the long term. We predict an increase in large snags in the short term, then a decrease in the long term.

All alternatives maintain the mature forest character of the area. The Action alternative predicts slightly less large trees in the short (-2.8 per acre) and long (-5.3 per acre) term, but is similar to the current conditions. All alternatives predict the similar numbers of large snags in the short and long term. Large down log predictions are very similar for all alternatives, however the action alternatives predict slightly higher levels in the short (+0.4 tons per acre) and long (+0.7 tons per acre) term. Predictions for shrub and forb component shows improvement for the action alternatives in the short term, and although there is a decrease in the long term is still higher than the no action alternative.

#### Olive-sided Flycatcher

Under the No Action Alternative, modeling indicates no additional increase in openings in the short or long term, but a continued slight increase in very large trees in the short and long term. A change is predicted for a slight increase in large snags in the short term, but slight decrease in the long term. Stands continue to maintain the highly heterogeneous nature in diameter sizes with an index of dispersion <0.01 for all stands.

Under the Action Alternatives, modeling indicates a similar stability in acres of openings in the short and long term, but a continued slight increase in very large trees in the short and long term. We predict a greater increase in large snags in the short term, then a decrease in the long term. All alternatives maintain the mature and snag characters of the area, however are predicted not to change the amount of openings in the short or long term. The Action alternative predicts slightly more very large trees in the short (+0.3 per acre) and long term (+1.0 per acre). All alternatives predict the similar numbers of large snags in the short and long term.

#### Hermit Thrush

Under the No Action Alternative, modeling indicates a continued increase in canopy closure, down logs in the short and long term. A change is predicted to decrease in aspen, oak and snags in the short and long. Stands continue to maintain the highly heterogeneous nature in diameter sizes with an index of dispersion <0.01 for all stands.

Under the Action Alternatives, modeling indicates a decrease in canopy closure in the short term, and then remains stable in the long term. Down logs continue to increase in the short and long term. Aspen shows large increases in the short term, and then decreases in the long term, but still well above current levels. Oak is predicted to make a large decrease in the short term, but remain close to those levels in the long term. Snags continue their decline in the short and long term.

Declines in deciduous trees and snags under all alternatives are a concern for this species. Large increases in aspen under the action alternatives relieves some of that concern, but the large decreases in oak are of large concern. Losses in snags appear to be primarily in the small to mid-sized classes (<18" dbh). All alternatives maintain numbers >2 snags per acre, in both the short and long term.

#### Purple Martin

Under the No Action Alternative, modeling indicates no additional increase in openings in the short or long term. A change is predicted for a slight increase in large snags in the short term, but slight decrease in the long term. Numbers of all snags continues to decline in the short term, but increases slightly in the long term.

Under the Action Alternatives, modeling indicates a similar stability in acres of openings in the short and long term. We predict a greater increase in large snags in the short term, then a decrease in the long term. Numbers of all snags continues to decline in both the short and long term.

All alternatives maintain large snags in the area, increasing in the short term. Long term levels for all alternatives are still above current. Overall snag numbers are higher in the no action alternative for the short (+0.5 per acre) and long (+3.5 per acre) term.

#### Breeding Season Disturbance

For those species of migratory birds that breed in the forested habitats of the North Kaibab, any vegetation treatment activities that take place during the breeding season may have effects to reproduction of these birds through noise and stress to the adults and young. These effects should be of short duration (1-2 breeding seasons). We also recognize that we do not have

perfect knowledge of what migratory bird species and where each nest is located within the project area, therefore some nests may be destroyed, and some incidental deaths may occur due to vegetation treatment activities.

#### Overwintering Areas

Because APIF focuses on breeding season habitat, we do not have a lot of details of wintering habitat needs for these priority species. SWIS important winter habitat analysis can tell us how much of the potential important wintering habitat will be treated under the different alternatives, but actual effects cannot be determined. Details of treatment types by APIF species and Alternative can be found in Tables F-7 through E-12 in document #200 (East Rim Project Record). In general terms, approximately half of the potential important winter habitat would be treated for golden-crowned kinglet, Mexican spotted owl, northern goshawk, pine grosbeak, three-toed woodpecker. How this affects the quality of the wintering habitat cannot be evaluated at this time.

#### Conclusion and Cumulative Effects

To generalize the effects to migratory birds for the East Rim project, all of the alternatives (action and no action) have both positive and negative results for migratory bird breeding habitat, but differences appear to be relatively small. Given that the action alternatives contain portions of the area that will receive treatments, and portions that are equivalent to the no action alternative, the negative aspects of either should be mitigated by the other. Below in Table 14 are generalized results by alternative and the amount of habitat treated. Table 15 contains generalized results by alternative for effects to potential overwintering habitat.

Besides the direct and indirect effects described above of implementing the alternatives, other similar activities have taken place in the past and are proposed for the future (Table 7). The most similar activities are the active Dry Park Timber Sale (for the purpose of goshawk habitat management) and the foreseeable Telephone Hill and Apache Trout (for fuels reduction in Apache trout stream headwaters) projects. Vegetation and fuels treatments might take place in both the Dry Park and East Rim areas during the same general period of time, so the short-term effects described above could cover a larger area. Given the amount of area involved, disturbance activities could not only affect individual birds but also, through such responses as reduced reproduction, temporarily affect population levels. Long-term effects would also happen over a larger area. The long-term effects are expected to be positive, including an increase in diversity of habitats and enhancement of ponderosa pine and mixed conifer habitats.

**Table 14. Summary of Effects to Breeding Habitat by Alternative for the East Rim Project.**

	Acres of Habitat	Percent of Area Treated		
		Alt 1	Alt 2	Alt 3
Spruce-fir	3134	0%	67.4%	51.7%
Swainson's Thrush		-	+	
Pine Grosbeak		+	+	
Golden-crowned Kinglet		+	+	
Three-toes Woodpecker		+	++	
Mixed Conifer	4799	0%	61.3%	33.8%
Northern Goshawk <sup>1</sup>		+/-	+/-	
Mexican Spotted Owl <sup>2</sup>		+/-	+/-	
Olive-sided Flycatcher		+	++	
Aspen	2382	0%	22.4%	4.9%
Red-naped Sapsucker <sup>3</sup>		+	+/-	
Ponderosa Pine	4791	0%	56.4%	46.2%
Northern Goshawk		+/-	+/-	
Olive-sided Flycatcher <sup>4</sup>		+/-	++/-	
Hermit Thrush <sup>5</sup>		+/-	+/-	
Purple Martin		++	+	

<sup>1</sup> declines in shrub component; <sup>2</sup> declines in size class distribution; <sup>3</sup> size class distribution problems; <sup>4</sup> lack of openings; <sup>5</sup> declines in deciduous component

**Table 15. Summary of Potential Overwintering Habitat Effects for the East Rim Project.**

	Alt 1	Alt 2	Alt 3
Golden-crowned Kinglet	0%	47.1%	46.3%
Mexican Spotted Owl	0%	57.7%	57.7%
Northern Goshawk	0%	53.7%	52.5%
Pine Grosbeak	0%	47.1%	46.3%
Three-toes Woodpecker	0%	49.0%	47.7%

**Threatened, Endangered and Sensitive Wildlife Species**

The East Rim Planning Area provides habitat for a variety of wildlife species. No Threatened or

Endangered species are known to occur in the East Rim Planning Area. Since no breeding MSO have been found on the North Kaibab, no effects are expected to individual owls or their reproduction (see USFWS concurrence letter document #180 in the East Rim Project Record). See MSO Restricted Areas above for a discussion of MSO habitat effects.

Apache trout are located outside of the planning area within the Saddle Mountain Wilderness. Some effect to this species is expected, but neither the trout nor their habitats are likely to be adversely affected (see USFWS concurrence letters document #179 in the East Rim Project Record).

Forest Service **Sensitive species** known to occur within the Planning Area are: northern goshawk, flammulated owl, sharp-shinned hawk, Kaibab squirrel, spotted bat, occult little brown bat, long-eared myotis and Yuma myotis.

Alternatives 2 and 3 would have minimal to no impact on the sharp-shinned hawk or the flammulated owl and no negative impacts on forest bats. These alternatives would not reduce the viability of **snag**-dependent species.

Effects to the other Sensitive species are presented in the section above, Management Indicator Species (MIS). See documents #114a, #132, #134, #135, #142 #154, #198, and #200 in the Project Record.

### **Grand Canyon Game Preserve**

The project area is located within the boundary of the Grand Canyon National Game Preserve. Approved in June 29, 1906 by the Senate and House of Representatives and Proclaimed as such on June 23, 1908 by President Theodore Roosevelt.

Section 1 of the act states the following:

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the President of the United States is hereby authorized to designate such areas in the Grand Canyon Forest Reserve as should, in his opinion, **be set aside for the protection of game animals and be recognized as a breeding place therefore.***

Section 3 of the act states the following:

*That it **is the purpose of this act to protect** from trespass the public lands of the United States and **the game animals which may be thereon**, and not to interfere with the operation of the local game laws as affecting private, State, or Territorial lands.*

The act was written specific to game animals and in fact in Section 2 of the act it states that:

*...**hunting, trapping, killing, or capturing of game animals** upon the lands of the United States within the limits of said areas shall be unlawful, except under such regulations as may be prescribed from time to time by the Secretary of Agriculture; ...*

In the actual Presidential Proclamation, President Theodore Roosevelt states the following:

*Now, therefore, I, THEODORE ROOSEVELT, President of the United States of America, by virtue of the power in me vested by the aforesaid Act of Congress, do hereby proclaim that all those lands within the area of the Grand Canyon National Game Preserve, as indicated on the attached diagram, are designated and set aside for the protection of game animals, and shall be **recognized as a breeding place therefore, and that the hunting, trapping, killing, or capturing of game animals upon the lands of the United States within the limits of said area is unlawful, except under such regulations as may be prescribed from time to time by the Secretary of Agriculture.***

It should be clear that the Grand Canyon National Game Preserve is targeted towards the protection of game animals, and probably more to big game such as the now infamous Kaibab deer herd. The proposed salvage harvest would be beneficial to deer by causing accelerated development of hiding cover due to the planting of seedlings. Recovery and reestablishment of hiding cover would be quicker than if the area were left to regenerate naturally. Additionally, reduced disturbance due to road closures/decreased road densities post-harvest would be a benefit to big game. Therefore, the activities associated with this project are not in violation of the Grand Canyon National Game Preserve's original intent.

### **Kaibab Squirrel National Natural Landmark**

National Natural Landmarks (NNL) are areas representing the best examples of the ecological and geological features composing our Nation's natural history. An area designated as a NNL is a nationally significant natural area that has been designated by the Secretary of the Interior.

The NNL Program was established to help identify and encourage the preservation of these significant areas. The objectives of the program, which is administered by the National Park Service, are to encourage the preservation of sites illustrating the geological and ecological character of the United States, to enhance the scientific and educational value of sites thus preserved, to strengthen public appreciation of natural history, and to foster a greater concern in the conservation of the Nation's natural heritage.

The Kaibab squirrel's habitat (ponderosa pine) was recommended for NNL status by J. Clark Salyer, Bureau of Sport Fisheries and Wildlife, in 1962 due to public interest in the Kaibab squirrel as a unique mammal and because of the spectacular history of the Kaibab deer herd. The squirrel's habitat consists of approximately 278,000 acres of pure ponderosa pine on the Kaibab National Forest and Grand Canyon National Park with approximately 200,000 acres on the Kaibab National Forest.

The designation was biological: climax formation of ponderosa pine, the sole habitat for the Kaibab squirrel. The recommendation was that the Kaibab squirrel habitat in northern Arizona be designated a Registered Natural Landmark to perpetuate the rare Kaibab squirrel. Final Designation of the National Natural Landmark occurred in October of 1965.

District Biologist, Melissa S. Siders, meets with Margi Brooks, NNL Coordinator, to discuss and review the status of the habitat of and the Kaibab squirrel, current management, the effects of

wildfire, etc. with the NNL every two years. The visits are on site and used to supplement scheduled updates or reports to the Washington Office specific to the National Natural Landmark program. Margi is not concerned with vegetation management project’s effects on the Kaibab Squirrel National Natural Landmark. The NNL on the North Kaibab received the highest possible site condition rating during the 2002 field visit (See document #206).

**Soil and Watershed**

Alternatives 2 and 3 would have a minor effect on the overall soil and watershed conditions in the East Rim area. Under Alternative 1, natural and some accelerated erosion processes would continue; tree densities would increase, resulting stress to the plants and that could make them more susceptible to insects. It could also increase the potential for stand-replacing wildfire. Soil and watershed conditions could be impaired if stand-replacing wildfires occur.

By implementing the mitigation measures in the Project Record along with standard timber sale contract provisions, soil compaction greater than 15% of the average nondisturbed site bulk density would be limited to no more than 10% of the treated area. Infiltration rates would decrease on no more than 10% of the treated areas. Alternative 2 would have the potential to sterilize 216 acres (from burning of slash piles, management-ignited fire and **jackpot burning**) and Alternative 3 to sterilize 136 acres. The detrimental effects would be short term (3-10 years). Management-ignited fire would recycle nutrients and result in short-term improvements in **soil productivity**. Table 16 shows the factors that affect soil and watershed health by alternative.

**Table 16. Factors that Affect Soil and Watershed Health by Alternative.**

<b>Effect Factors</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
Temporary Road Construction (miles)	0	0.75	0.75
Road Obliteration (miles)	0	4.8	4.8
Current Open Road Density (miles)	129	129	129
Open Road Density Post Treatment (miles)	129	39	39
Acres of Machine Piling	0	6688	4508
Acres of Management-ignited Rx Fire	0	1019	1771
Acres of Jackpot Burning	0	2939	2543
<b>Approx. acres of soil impaired by fire:</b>			
Slash Piles	0	98	75
Management-ignited Rx Fire	0	15	15
Jackpot Burn	0	15	15

Under Alternative 1, natural and some accelerated erosion processes would continue. No soil compaction or displacement would occur and no soil sterilization. Open road density would remain at its present status, though roads would close naturally over time if left alone. Vegetation and tree densities would increase, resulting in less water being available to each plant during drier periods of the year and during droughts. The lower amounts of available water would increase the stress to the plants and could make them more susceptible to insects. It could

also lead to lower live fuel moistures in plants during the summer months, which could increase the potential for stand-replacing wildfire. Soil and watershed conditions could be impaired if stand-replacing wildfires occur. With a wildfire, soil displacement and soil sterilization would be expected.

Roads are one of the main sources of accelerated erosion. Alternatives 2 and 3 would result in 39 miles of open roads when all activities are completed. These roads would be kept open as part of the permanent transportation system in East Rim.

Compaction and soil displacement impacts increase with the number of times equipment crosses an area, either with log removal or with mechanical brush piling. Alternative 2 would impact the soil the most due to harvesting the largest acreage. The assumptions used to make the calculations in Table 10 are presented in document #118 in the project record. Also see documents #100, #101 and #105 in the Project Record.

*Cumulative Effects.* Past, present and future projects in Tater Canyon, Cane (Kane) Canyon, Dog Canyon and Pleasant Valley Outlet watersheds would be expected to cause limited short-term (3-5 years) effects and minor long-term (greater than 20 years) changes to the soils and watersheds. Watershed conditions should return to satisfactory levels within 2 to 5 years in any treated areas.

### **Air Quality**

Air quality in the East Rim area (part of a Class 1 airshed) could be affected by such activities as slash pile burning, **broadcast burning**, road maintenance, logging activity and forest visitor use. All of the alternatives, except for Alternative 1, include activities that could affect air quality. Alternative 1 would implement no burning activities, so there would be no smoke from *intentionally set* fires. With Alternative 1, however, fuel loadings and tree densities would continue to increase, thereby increasing the risk of large, **stand-replacing fires**. These fires would have unfavorable impacts on the air quality in East Rim and surrounding areas. As noted in the Fuels Report (document #104), Alternative 1 would allow “increasing potential for high particulate matter emissions as fuel loads and understory biomass (carbon) increase.”

The action alternatives include activities that could affect air quality. Management-ignited prescribed fire, as proposed by Alternatives 2 and 3, would promote better fire control, predictable fire effects and better management of emissions than wildfires would. The effects of burning slash piles and broadcast burning are short term in nature and dissipate within hours or days. Due to the location of East Rim there is a high probability for some smoke to collect in low-lying areas of Grand Canyon National Park during the night when downslope winds occur. The majority of the smoke would dissipate during daytime burning operations. The smoke column would be visible from within Grand Canyon National Park if the burning were done during daylight hours and clouds were minimal.

The action alternatives would produce dust, noise and smoke, which at times could be detected in the Saddle Mountain Wilderness Area. These effects would be short-term and would dissipate within hours (dust and noise) or days (smoke).

To minimize smoke, burning would follow direction in an approved burn plan. Burning would be done only after receiving notification from Arizona Department of Environmental Quality (ADEQ) that burning can proceed. ADEQ is the regulatory agency for air quality (including smoke) in Arizona. If there were a smoke violation, one possibility would be that it resulted from inaccurate predictions from the National Weather Service. Federal law restricts emissions of particulate matter. See document #152 in the Project Record for mitigation measures that ensure smoke would be managed and limited.

*Cumulative Effects.* Because most burning in northern Arizona occurs in the fall, short-term cumulative impacts from simultaneous ignitions from other projects could occur. ADEQ tracks which agencies and other parties are proposing to burn fuels, and it limits the accumulation of smoke by disapproving applications for burning that exceed the predicted potential of the atmosphere to disperse the smoke.

**Economics**

Table 17 displays the calculated benefit: cost ratio results and the present net value (PNV). Future revenues and future costs were discounted back to the current year by 4% per year. The benefit: cost ratio is strictly a comparison of the revenues received per dollar of cost. A ratio greater than 1 indicates that revenue is higher than costs; a ratio less than 1 indicates costs higher than revenues. A positive PNV indicates an amount by which revenues exceed costs; a negative PNV indicates how much costs exceed revenues. See documents #106 and #140 in the Project Record.

**Table 17. Calculated Benefit: Cost Ratio Results and the Present Net Value (PNV)**

<b>Revenues and Costs</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
Revenues: Present Value \$	0	1,262,939	1,026,138
Costs: Present Value \$	50,000	366,527	366,411
Present Net Value \$	(50,000)	896,412	689,727
Benefit: Cost Ratio	0.0:1	3.45:1	3.05:1

**Cultural Resources**

All treatment areas within the East Rim Planning Area have been systematically surveyed (see docs. #110 and #133). The sites that were found and any site located during the proposed activities will be protected by standard protection measures. Therefore, no significant effects are foreseen, and no loss or destruction of significant scientific, cultural, historic or **heritage resources** is anticipated. Concurrence from the State Historic Preservation Office is document #13 in the Project Record. Consultation with local American Indian tribes was conducted to identify any areas of cultural sensitivity within the Planning Area. No specific areas were identified.



## V. GLOSSARY

Acre - A unit measurement of land area containing 43,560 sq. ft., approximately 209 feet by 209 feet.

Audit Unit - An area of land whose boundaries match stand boundaries and is an approximation of a particular goshawk **foraging area** or post-fledging area.

Broadcast Burning - A type of prescribed burning in which a controlled fire is allowed over a designated area within well-defined boundaries to achieve clearly defined management objectives.

Basal Area - The cross-sectional area of a tree's bole at 4.5 feet above the ground, and expressed as a ratio of bole area to land area (for example: sq. ft./acre). The basal area of stands is the cross-sectional area of all trees in the stand divided by the number of acres in the stand.

Commercial Thinning - A thinning operation in which all or part of the felled trees are removed for useful products.

Cover Type - The dominant tree species that occurs in a stand.

Dwarf Mistletoe - A parasitic plant that grows on conifer trees and uses water and nutrients from the trees.

Foraging Area - An area of roughly 5400 acres used by the northern goshawk for foraging.

Fuelbreak - Land that is maintained at a low level of vegetation, both live and dead, to impede the spread of a wildfire.

Fuel Loading - The amount of combustible material present in a given area, usually expressed in tons per acre.

Group Selection - Removal of small groups of trees from an uneven-aged forest.

Heritage Resource - The remains of sites, structures, or objects used by humans in the past (more than 40 years ago); either historic or prehistoric.

Jackpot Burn – Burning slash that is in natural concentrations (jackpots). The slash has not been piled but has usually been lopped.

Lopping – Treating slash so that it will lie closer to the ground and thus decay more rapidly. Usually done with chainsaws and cut so that the slash is within 2 feet of the ground.

Machine Piling Slash – Slash that is piled with a bulldozer. Piles are generally no larger than 25 feet in diameter and 10 feet in height.

Management-ignited Prescribed Fire - Fires that are ignited by resource managers to meet management objectives and allowed to burn only under certain conditions.

Mixed Conifer - A cover type that is characteristically dominated by white fir, Douglas-fir or blue spruce; other tree species may or may not be present.

MMBF - One million board feet of timber.

Nest Area - An area roughly 30 acres in size which may include more than one nest. A goshawk pair occupies the nest from early March to late September.

Non-commercial Thinning - The practice of removing some trees of less than merchantable size (<5 inches in diameter) from a stand so that the remaining trees will grow faster.

Pile Burning - The burning of activity generated slash or existing fuels that have been piled by hand or by machine.

Post-fledging Family Area – (PFA) An area of roughly 420 acres where young goshawks learn to hunt; within that area the desired tree density is greater than in the foraging area which surrounds the post fledging-family area.

Restricted Areas - Under the Recovery Plan for the Mexican Spotted Owl all mixed conifer stands, as defined in the Recovery Plan, are managed as restricted areas. Within the restricted habitat, 25% of the stands must be managed either as target/threshold stands or managed so that they can reach the target/threshold conditions.

Sanitation/Salvage - Removal of dead, damaged, or infected trees primarily to prevent the spread of insects or diseases and to promote forest health.

Sensitive Species - A plant or animal identified by the Forest Service for which the population viability is a concern.

Slash - The residue left on the ground after logging, including logs, uprooted stumps, branches, twigs, leaves and bark.

Snag - A standing dead tree.

Soil Productivity - The inherent capacity of the soil to support the growth of specified micro-organisms, plants, plant communities or a sequence of plant communities.

Stand - A spatially continuous group of trees and associated vegetation having similar structures and growing under similar soil and climatic conditions.

Stand-replacing fire - A severe fire which burns through the forest canopy (crown fire) and kills all or nearly all of the trees over a large area, setting the area back to an earlier successional stage.

Succession - The change in species composition as a forest stand ages--from bare soil to grass to shade intolerant tree species such as aspen or ponderosa pine to shade tolerant species such as white fir, subalpine fir or Engelmann spruce.

## **APPENDIX 1. EAST RIM VEGETATION MANAGEMENT ENVIRONMENTAL ASSESSMENT COMMENT RESPONSES**

Seven groups or individuals commented on the East Rim Vegetation Management Environmental Assessment. The Forest received six letters and one telephone call regarding East Rim. The telephone call was an inquiry from the USFWS about changes between the May 2001 EA and November 2002 version (see doc # 216 in the project record) and didn't contain substantive comments.

Three of the six letters received contained general comments or position statements that did not specifically address the East Rim Vegetation Management Project. Please see the comment analysis (document # 227) in the project record. The following are the substantive comments and Forest Service responses from the three project specific comment letters.

### **Letter 4. Kim Crumbo (Arizona Wilderness Coalition).**

Comment 4.1: "We disagree that only big game deserve priority regarding protection."

*4.1 Forest Service Response: The Game Preserve is targeted towards the protection of game animals (pp. 53-54 of the EA). However, the existence of the game preserve did not preclude the Forest Service from addressing potential impacts to recreation, heritage, visual, wildlife, vegetation (including old growth), and soil and watershed resources and taking steps to protect these resources through proposal development, alternatives development, and mitigation (see EA pp. 5-11; 15-21; and document #152 – Mitigation/Design Criteria for East Rim Vegetation Management).*

Comment 4.2: "We believe that forest management for native wildlife preservation supercedes any other uses."

*4.2 Forest Service Response: This comment is a general position statement and does not specifically address the East Rim Vegetation Management EA.*

Comment 4.3: "In spite of the EA's rosy assessment regarding the NNL site condition rating, NNL designation has not adequately protected this unique, ecologically significant, and beautiful creature. Forestry practices and the current drought threaten these unique populations (Patton 1985; Jack States 2002 and Joseph Hall; personal communications). Ironically the situation is further compounded by the management efforts in forest restoration and fire management in place on the Plateau (Jack States 2002, personal communication)."

*4.3 Forest Service Response: We recognize that there is recurring confusion regarding the National Natural Landmark designation and wish to clarify its intent. Please refer to page 54 of the EA and document 181 of the Project Record: "National Natural Landmarks (NNL) are areas representing the best examples of the ecological and geological features composing our Nation's natural history. The objectives of the [NNL] program, which is administered by the National Park Service, are to encourage the preservation of sites illustrating the geological and*

*ecological character of the United States, to enhance the scientific and educational value of sites thus preserved, to strengthen public appreciation of natural history, and to foster a greater concern in the conservation of the Nation's heritage." Note that since the NNL designation refers to sites, it is the Kaibab Plateau pine forest that is recognized as a National Natural Landmark, and not the Kaibab squirrel. The NNL designation encourages preservation of the squirrel's habitat; it does not provide protection for the species. Further, the NNL designation does not invoke land use restrictions or affect management activities. (For a more detailed discussion of the NNL designation and its intent visit the USDI Park Service National Natural Landmarks Program website at [http://www.nature.nps.gov/nnl/NNL\\_FAQ.htm](http://www.nature.nps.gov/nnl/NNL_FAQ.htm)).*

Comment 4.4: "We believe that the "Game Preserve" and NNL designations require additional consideration for resource protection, specifically protection of all native wildlife."

*4.4 Forest Service Response: See response 4.1 and 4.3*

Comment 4.5: We urge the Forest planners to reduce road densities based on ecological concerns as well as budgetary constraints.

*4.5 Forest Service Response: Road densities are based on ecological concerns and budgetary concerns. See EA pp. 55-56 - Soil and Watershed for a discussion of road closure and the Kaibab National Forest Forest Level Roads Analysis document #225 in the project record.*

Comment 4.6: Closing roads within the planning area is consistent with conservation principles applicable to Game Preserve designation.

*4.6 Forest Service Response: This comment is a general position statement and does not specifically address the East Rim Vegetation Management EA.*

Comment 4.7: The arguments presented above provide compelling rationale to significantly reduce road densities forest wide in order to meet the intent of the Game Preserve and NNL designations.

*4.7 Forest Service Response: Road closure proposals included in the East Rim Vegetation Management are specific to the East Rim Planning area. Reducing road densities forest-wide is beyond the scope of this project*

Comment 4.8: For reasons presented above, our closure recommendations consist of two "roads to nowhere": forest route 610 north of the Arizona Trail and forest route 221. Each route deadends in the forest. Since road access to primitive camps abounds throughout the Forest, and since Forest route 611 (East Rim) and 219 (Marble View) provide ample access to spectacular vistas, the ecological benefits of closure would far outweigh any marginal recreational opportunities lost.

*4.8 Forest Service Response: The East Rim EA states the proposed action would re-close approximately 90 miles of roads used for harvesting timber and associated activities. In actuality, approximately 65 miles of road would be closed (see document 226 "East Rim Timber*

*Sale Road Maintenance Drawings and Specifications in the project record). The approximate 90-mile figure was an estimate that was refined to approximately 65 miles when the road specifications package was completed. This refinement does not change the analysis and conclusions presented in the environmental assessment.*

*All roads slated for re-closing are now closed. No currently “open” roads would be closed. These are temporary roads that will be open for short-term access during vegetative treatments (no change in access therefore a project RAP was not triggered). They are generally short, low-standard, dead-end roads. Road 221 does not meet the closure criteria.*

*Forest Roads 610, 611, 230, 213, 462, 641, 221 and 420 would remain open. Forest road 610 was analyzed in the Kaibab National Forest, Forest Level Roads Analysis document #225. The Forest-wide RAP determined that all segments of road 610 have a “high” value class (Appendix A document # 225 in project record).*

*The East Rim EA page 55 Table 16 refers to 4.8 miles of road obliteration. As detailed in Document #100 - “Watershed Proposals for East Rim” **this road (in Dog Canyon) was closed as part of the Dog Lake timber sale in 1990.** “It is causing erosion, sedimentation, and subsurface water flow problems. ...every Fall it gets opened back up and there are signs of heavy traffic using it. Due to the continued use, the road will need to be obliterated (i.e. made so no one wants to or can drive down it).” **This proposal would only reclose this already closed road.***

**Letter 5. Brian Segee (Center for Biological Diversity), Sharon Galbreath (Southwest Forest Alliance), and Roxane George (Plateau Group Sierra Club)**

Comment 5.1: The designation of the Grand Canyon Game Preserve and the Kaibab Squirrel National Natural Landmark “place a higher and distinct responsibility on the Forest Service management than those responsibilities found in the Organic Act of 1897, the National Forest Management Act, and other major statutory and regulatory provisions governing actions by the Forest Service.”

*5.1 Forest Service Response: We are following the Kaibab National Forest Plan, which was developed with the Game Preserve in mind. All proposed treatments have the intended purpose of moving the Planning Area to a condition closer to the historic range of natural variability. This condition is the one that all native species within the East Rim area have either evolved with or adapted to.*

*See response 4.3 for a NNL discussion.*

Comments 5.2 and 5.32: “...the Forest Service proposes to log within goshawk nest stands and ignore Mexican spotted owl recovery plan and forest plan requirements for designation of owl territories within historical sites”... “The Forest Service has failed to designate Protected Activity Centers (PACs) at historic territories within the East Rim timber sale.”

*5.2 and 5.32 Forest Service Response: The vegetative treatments in the proposed action were designed to provide for implementation of the goshawk standards and guidelines in the Kaibab National Forest Land Management Plan, as amended. Please refer to pages 30 and 31 of the Forest Plan. Note that direction for the northern goshawk does not restrict timber harvest in either existing or replacement nest stands, except during the breeding season. Under the proposed action, thinning would occur only in replacement nest stands (Environmental Assessment, page 5). Thinning activities would not take place during seasonal restrictions (A list of mitigation measures is provided in doc. #152 of the Project Record. These measures are incorporated in the EA by reference on page 21).*

*The vegetative treatments in the proposed action were also designed to maintain or improve habitat for potential Mexican spotted owls (EA, page 5). However, there are no confirmed spotted owls in the East Rim Planning Area or within the North Kaibab Ranger District (Project Record doc. #154, page 7). Per the Mexican Spotted Owl Recovery Team's "Procedure for Evaluating Historical Owl Locations" (doc. #207), no owl territories (Protected Activity Centers, PACs) have been established for historical locations. Further detail is provided on page 13 of the EA: "A July 2000 letter from the U.S. Fish and Wildlife Service (doc. #139a) states that 'any surveys conducted since 1990, and any conducted in the future, that meet the currently-used survey protocol and fail to detect spotted owls, will be sufficient to justify elimination or non-designation of a PAC at a historical site.'"*

Comment 5.3: "It would be appropriate for the Forest Service to use these meetings to state that they have worked towards a scientific understanding of the mixed-conifer old growth on the East Rim area."

*5.3 Forest Service Response: The Forest Service informed the old growth working group that they would incorporate the working group old growth definitions/recommendations into the Jacob-Ryan planning effort and not into East Rim. The group concurred.*

Comment 5.4: "A key issue that remains unresolved is the District's entry into previously designated old-growth stands, known as '803' Stands."

*5.4 Forest Service Response: All previous references to, and definitions of, old growth have been replaced in and superceded by the amended Kaibab National Forest Plan.*

Comment 5.5: The Forest Service failed to take a 'hard look' at the Environmental Consequences of the East Rim Timber Sale." "...the East rim contains no scientific reference or bibliography."

*5.5 Forest Service Response: The Forest Service took a hard look at the environmental consequences of the East Rim vegetation management project. Please see the East Rim EA pages 22-57 and documents 3, 96,97,98,100, 101,102,103,104,105,106,107, 108,109,110,111,112,113,114,114a, 115, 140, 154, 160a, 181, 182, 196, 198, 200, 201, 202, 203, 204, 205, 210, and 221 in the project record.*

*References cited is not a required section of an EA (40 CFR 1508.9 (b)). The EA incorporates the bibliographical information from all cited documents by reference. Please see the individual specialist's reports in the East Rim project record for this bibliographical information.*

Comment 5.6: “The Forest Service failed to Disclose or Analyze the Extent of Large Old-Growth Trees Which Will Be Logged on the East Rim Timber Sale”

The issue is the “removal of any old-growth and large Trees given the rarity of these trees and habitat types on both the Kaibab National Forest and on a regional scale.”

*5.6 Forest Service Response: The Forest Service disclosed and analyzed the effects to old growth see EA 22-25 and the old growth analysis, document 113, in the project record.*

*The Forest Service analyzed the germane part of this issue statement in its issue analysis. Effects were analyzed on a PFA and EMA scale. Analyses at the Kaibab National Forest or regional Scale are beyond the scope of this project.*

Comment 5.7: “The EA contains very little information to substantiate Forest Service claims that old growth will benefit from the Proposed Action.”

*5.7 Forest Service Response: Page 23 and 24 of the EA state: “The acreage of old growth in East Rim would remain unchanged in all alternatives. Approximately 6500 acres (approximately 43% of the Planning Area acreage) would either meet the criteria immediately after treatment or would be placed on a trajectory to achieve them.*

*Alternative 2, the Proposed Action, would preserve old growth after treatment and would meet criteria in the KNFLMP after treatment. This is because the proposed treatment is to thin from below and retain the large trees that permit the stands to meet the old growth criteria.*

*Treatment is proposed for most old growth stands in this alternative. Treatment prescriptions would retain at least the minimum basal area--for old growth in the particular cover type according to the amended KNFLMP--and all trees greater than 18” (20” in mixed conifer) except where removal would be necessary due to disease. All areas that were previously identified as old growth in the 1987 amendment to the Forest Plan would also be treated in this manner. These stands would either meet the old growth criteria after management or would be managed in a manner to achieve them over time if not currently meeting them. Additionally, goshawk PFA's, both ponderosa pine and mixed conifer, would be managed at levels that would meet the old growth criteria over time, as would target and threshold stands within MSO restricted habitat.*

*At a scale below the site level, 20% of the acreage in goshawk **foraging areas** would be managed for tree size and density that exceed the criteria in the Forest Plan. This would occur in tree groups rather than in stands, so it is uncertain how much of that acreage is unaccounted for in the 43% cited above.*

*Alternative 2 proposes actions that would help the old growth stands by 1) decreasing competition of other trees with the large-diameter trees, 2) thus allowing those trees greater growth potential and greater average life expectancy and 3) decreasing the likelihood of mortality due to wildfire because of the removal of ladder fuels that would facilitate fire ascending into the crowns of the large trees.*

*Thinning may move groups into the next higher VSS class because of the removal of smaller diameter trees from below the larger trees in the group. This will not only maintain the vigor of the larger trees but also increase their growth into the larger classes and lead to more stands and groups meeting the old growth tree diameter criteria over time.”*

Comment 5.8: “Given the North Kaibab’s method of implementing the MRNG, the number of trees left does not provide an accurate assessment of potential impacts.”

*5.8 Forest Service Response: We disagree. The number of trees left after harvest provides a better measure for implementing MRNG as specified in the Kaibab National Forest LMP. However the table below describes approximate number of trees expected to be removed under the proposed action and the total percentage removed by size class for the entire East Rim Planning area (doc. #229).*

<i>Size Class</i>	<i>Approximate Number of Trees in the East Rim Planning Area by VSS Class (Existing Condition)<sup>1</sup></i>	<i>Approximate Number of Trees expected to be removed from the East Rim Planning Area by VSS Class (Proposed Action)</i>	<i>Approximate Percent of Total Trees Removed by VSS Class for the Planning Area</i>
VSS 3	1,380,447	216,500	15.7 %
VSS 4	654,339	43,000	6.6 %
VSS 5	254,323	7,000	2.8 %
VSS 6	119,841	400	0.3 %

<sup>1</sup> Numbers generated from Document #102 (East Rim Vegetation Report)

Comment 5.9: “The EA contains no discussion or explanation of how removing individual, mature trees with fire resistant bark (regardless of size), helps” old growth by reducing competition and reducing the likelihood of mortality due to fire.

*5.9 Forest Service Response: The District would not be removing large fire-resistant trees. Rather, for the most part, the proposed action would remove excess trees of more fire-vulnerable species.*

*Stand-replacing fire risk gradually increases when fuels are not treated in one manner or another, especially in moisture-limited forests where decomposition is quite slow. High and increasing levels of fuel loading (both live and dead) along with abundant fuel ladders in old-growth stands provide a large volume of continuous fuel to be carried by crown fire.*

*Please see the East Rim EA pages 23 paragraphs 7, 8, 9 and page 24 paragraphs 1, 2, 3.*

Comment 5.10: “The EA references document number 113 in the project record for a detailed analysis of old growth acreage. Any analysis contained in this analysis should be part of the EA.”

*5.10 Forest Service Response: The EA summarizes pertinent information contained in document 113 and discloses effects and draws conclusion based on the analysis. Document 113 is incorporated by reference to create an analytic document rather than an encyclopedic one.*

Comment 5.11: “The environmental assessment does not explain how the North Kaibab’s implementation of the MRNG, which includes logging thousands of large diameter and old growth trees well beyond what the MRNG calls for, actually benefits goshawks or their prey species.”

*5.11 Forest Service Response: The purpose of an Environmental Assessment is to disclose effects of the proposed action. Although no summary of how treatments benefit wildlife is required in an EA, one is provided on page 25. Specific treatment effects and benefits for northern goshawk are detailed in the Biological Assessment on page 6 (doc.# 160a of the Project Record).*

*The Management Recommendations for Northern Goshawk (MRNG) call for a distribution of tree size classes (referred to as vegetative structural stages, VSS) to provide desired characteristics for nest sites and prey habitat, rather than specific numbers of trees. No recommendations are made for number of trees to be either removed or retained. Under the proposed action, young (VSS 3 = 5-11.9”), mid-aged (VSS 4 = 12-17.9”), and mature (VSS 5 = 18-23.9”) trees would be removed in order to achieve desired size class distributions and the tree clumping patterns called for in the MRNG (EA, page 5). Only a small percentage (approximately 10%) of large trees (VSS 5) would be cut to achieve desired conditions (doc.#182, page 13). Please see Table 3 on page 11 of the EA for a summary of differences between existing and desired VSS conditions in the East Rim Planning Area. Note that there is a shortage of stands dominated by trees larger than 24 inches in diameter (VSS 6) and seedling and sapling groups (VSS 1 = 0-1”, and VSS 2 = 1-4.9”). There is a surplus in stands dominated by young (VSS 3) and mid-aged trees (VSS 4). While the overall planning area is deficient in stands dominated by large trees (VSS 5), some goshawk PFAs (post-fledging family areas) have a surplus of large trees relative to the desired size class distribution. Leaving overly dense patches of large trees in those PFAs does nothing to compensate for a paucity of large trees in other parts of the planning area. The intent of thinning trees in the 18 to 23.9 inch size class is to stimulate recruitment of remaining trees into the larger size classes. The production of more trees greater than 24 inches over time will improve the tree size class distribution across the Planning Area and will place it on a trajectory toward the desired condition for northern goshawk and their prey species. Please see the Forest-level Management Indicator Species habitat analysis report (doc. 221 pages 15-18) for further discussion.*

*Please note that under the proposed action, all large trees (over 18 inches in diameter for ponderosa pine and 20 inches in diameter for mixed conifer) would be retained in stands that are defined as old growth by the Kaibab National Forest Land Management Plan, as amended, except where removal would be necessary due to disease (EA, page 23).*

Comment 5.12: “And EIS must be done on the Site-Implementation of the Management Recommendations for the Northern Goshawk (MRNG) Because the Forest Service Never Conducted an EIS on the Impacts of the MRNG.”

*5.12 Forest Service Response: The MRNG have been subjected to NEPA. Forest Service amended every Forest Plan in the Southwestern Region in 1996, including the Kaibab National Forest Plan, to ensure viable populations of the Mexican spotted owl and northern goshawk were maintained and remaining old forests protected (USDA Forest Service 1996, Record of Decision). Furthermore, the MRNG are subject to NEPA analysis every time the KNF proposes a project on the North Kaibab (see response 5.13 below).*

Comment 5.13: “Proposed Implementation of the MRNG in the East Rim Timber Sale Has Not Been Adequately Assessed for Effects on Northern Goshawks.”

*5.13 Forest Service Response: See EA pages 36-52. Also see the following documents in the project record: Wildlife Report and the BA&E, documents #154, #142, #160a, and 160b, and the stand alone MIS and migratory bird analysis documents #'s 196, 198,199,200, 201,202,203,204,205, and 221.*

Comment 5.14: “Because the MRNG has never been subjected to proper NEPA analysis, and the East Rim Timber sale relies on the MRNG, this sale cannot go forward until this analysis is completed.”

*5.14 Forest Service Response: MRNG adequacy is beyond the scope of the East Rim Vegetation Management project.*

Comment 5.15: “While the EA does not address the issue, hand tools clearly will not be used. This failure to use the preferred treatment within goshawk nesting sites without substantial justification and explanation violates the forest plan amendments.”

*5.15 Forest Service Response: Stating that “hand tools clearly will not be used” is purely conjecture. The Forest Service **will** follow KNFLMP management direction described in page 30 (“Within Nesting Areas”) of the Kaibab National Forest Land and Management Plan when working within nesting areas. The LMP states hand tools are preferred but does not preclude mechanical treatments from nest stands after the breeding season. Also see response 5.2 above.*

Comment 5.16: “...thousands of old and large trees are proposed to be logged, thereby decreasing the creation of future snags. This violates the forest plan. In addition, the issue of the requisite downed logs and woody debris is not addressed.”

*5.16 Forest Service Response: **Please note that snag retention discussed in the Forest Plan does not mean snag creation.***

*The issue of snags, downed logs, and woody debris is addressed in the EA through design features and mitigation measures for the proposed action, as well as through modeling of*

*treatment alternatives. Under the proposed action, the planning area includes both sites where vegetative treatments will be implemented and adjacent untreated areas that will provide for existing habitat characteristics (see map on page 7 of the EA). Tree, snag, and log densities would not be altered in these areas. The issue of snags, downed logs, and woody debris is additionally addressed through mitigation measures for the proposed action (Project Record doc. #152), which are incorporated by reference on page 21 of the EA. These measures include management direction for snags, downed logs, and woody debris from pages 29 and 30 of the Kaibab National Forest Land Management Plan, as amended. The issue of snags and logs is further addressed in the EA through modeling of treatment alternatives on pages 41 and 46-49.*

*We recognize that some confusion about the number of snags and downed logs to be retained under the proposed action may have resulted from Table 6 on page 22 of the EA. A smaller number of snags and logs are presented in this table than the vegetation direction provided by what the Forest Plan calls for. (To summarize Forest Plan direction, 3 snags, 5 downed logs, and 10-15 tons of woody debris per acre are to be retained in mixed conifer; 2 snags, 3 downed logs, and 5-7 tons of woody debris per acre are to be retained in ponderosa pine. Additionally, one group of 3-5 reserve trees per acre are to be retained in both mixed conifer and ponderosa pine forest types to provide for future snags.) Please note that Table 6 is a simplified version of the Old Growth Habitat Characteristics table in the Forest Plan. The attributes in this table are used to define old growth areas; they are not the attributes used to direct vegetation management.*

Comment 5.17: “The desired forest conditions specified in the East Rim EA violate the canopy percentages required in the MRNG. The North Kaibab Ranger District has interpreted the forty plus and sixty plus percent canopy cover in the MRNG to be maximum numbers rather than minimums. Additionally, the East Rim EA contains no information or analysis on existing canopy densities in the various vegetative types in the East Rim area.”

*5.17 Forest Service Response: The MRNG (see page 7) does not require a range of canopy closures and instead lists only the minimum required. The EA proposes to treat to these minimums in some stands--with the understanding that forests are dynamic and that the canopy cover would increase over time after treatment. Areas that would not be treated to these minimums include old growth and Mexican spotted owl target or threshold stands.*

Comment 5.18: “While Table 3 of the EA (p. 11) displays ‘averages throughout the planning area,’ it is unclear whether these averages are derived only from the PFA’s and audit units, or from the planning area in its entirety.”

*5.18 Forest Service Response: As stated on page 11 of the EA, “the percentages shown in the “Existing” column are based on averages throughout the Planning Area”, i.e., the planning area in its entirety.*

Comment 5.19: “...the District must not only complete the analysis of VSS classes at the PFA or audit level, but also at the larger analysis area level.”

*5.19 Forest Service Response: The Forest Plan set aside all areas that are not PFAs as foraging habitat (unless they are MSO habitat). Because of site-specific concerns for individual goshawk pair foraging opportunities, the District is looking at an additional level of analysis.*

*The VSS distribution on the District as a whole (that is, on the portion of the District forested with ponderosa pine, mixed conifer, and spruce-fir habitats) is as follows:*

VSS1	-	10,972 acres	-	4.6% of the total [excludes meadow areas]
VSS2	-	1,002 acres	-	0.4% of the total
VSS3	-	44,871 acres	-	19.8% of the total
VSS4	-	18,332 acres	-	7.7% of the total
VSS5	-	99,750 acres	-	41.9% of the total
VSS6	-	62,912 acres	-	26.5% of the total

*The above information was derived from the District's stand database using VSS determination for the stands surveyed. Stand surveys on the NKR D are relatively complete and up-to-date.*

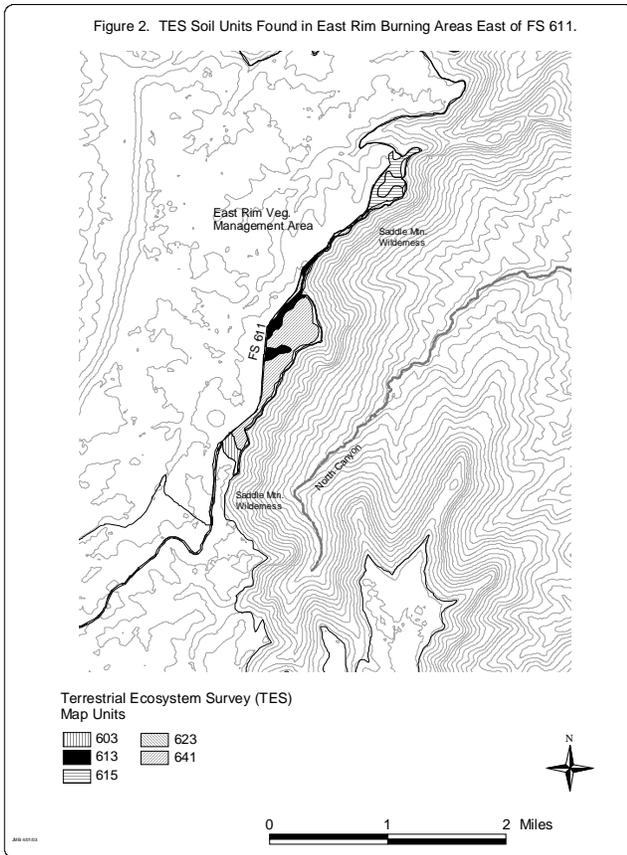
Comment 5.20: "The Forest Service Failed to Analyze or Disclose the Effects of the East Rim Timber Sale on the Saddle Mountain Wilderness Area."

*5.20 Forest Service Response:*

*The East Rim EA (pages 13, 52 and 55-57), Soil and Watershed Report (Document 105), and the Biological Evaluation (Document 182) disclose effects to the Saddle Mountain Wilderness, North Canyon, and Apache trout. The analysis was largely qualitative with conclusions based on the areas flat topography, the resource personnel's knowledge about the area, and distance to North Canyon. The Forest Service elected to build on these analyses with a quantitative soil loss analysis in response to comments 5.20 and 5.22 below. This analysis did not change the effects analysis or conclusions presented in the East Rim EA.*

*We used soil map units from Terrestrial Ecosystem Survey of the Kaibab National Forest (TES) (Document #234) to determine current, expected, and tolerance soil loss estimates. The analysis was based on the following assumptions:*

- 1) Assume FS road 611 is a contour break and everything east of 611 has the potential for running into North Canyon. Everything west of FS 611 does not drain into North Canyon. North Canyon is the only perennial stream on the NKR D and the only stream in the wilderness area that could be impacted by East Rim Vegetation Management.*
- 2) Assume tree harvest and associated activities (temp. road clearing, skid trails, landings, etc.) will result in zero ground cover over 10 percent of each TES Unit cut (Dave Brewer KNF Range and Watershed Specialist 4/3/2003).*
- 3) Assume burning will result in zero ground over 2 percent of each TES Unit burned (Russ Truman, NKR D FMO 4/4/03).*
- 4) Cutting units along Saddle Mountain Wilderness boundary (east of FS611) will not occur on slopes >40%. The TES GIS data layer inaccurately projected soil map units greater than 40 % slope within East Rim Cutting units east of FS 611. This error was a result of map boundary drift from digitizing and scanning errors (– i.e., moving from paper or milar format to digital).*



Forest Service personnel field verified slopes in the analysis area and determined the projected 40% slope soil units do not occur in the East Rim cutting units under question (Ed Kolle, NKRD Supervisory Forestry Technician 4/2/2003). Therefore, greater than 40% slope map units were removed from the analysis or reassigned to other adjacent map units.

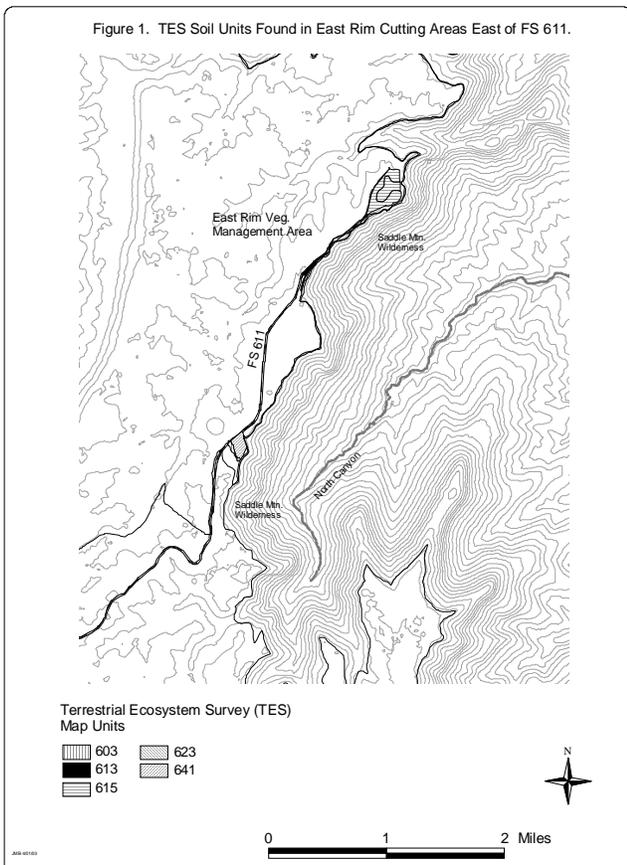
5) Pot, Tol, Cur were averaged when a TES Unit had multiple components.

The following table and histograms (below) represent the current, expected, and tolerance soil loss estimates from the cutting and burning units east of FS road 611 in the East Rim Vegetation Management project area (Figures 1 and 2). Table A is a summary of current, expected, and tolerance soil loss from treatment areas east of FS 611. Table A was derived from Figures A and B (see Document 234 for analysis tables).

The total expected soil loss is less than tolerance levels in all instances (Table A and Figures A and B). Therefore there will be no increase in soil loss or loss of soil productivity on the cutting and burning units east of FS road 611.

In addition, the soil and watershed BMPs described in the East Rim EA (pages 20-21 and, 55-57), Ecosystem Management Area Soil and Watershed report (Document 105) and the final Biological Evaluation (Document 182) will further reduce soil loss and effects to North Canyon and the Saddle Mountain Wilderness.

Furthermore, past (Kane Ranch EA) and foreseeable future (Apache Trout and Saddle Mountain Wilderness Trail Improvement) projects will continue to improve watershed condition in and adjacent to the East Rim Project area and Saddle Mountain Wilderness. For example, the Kane EA

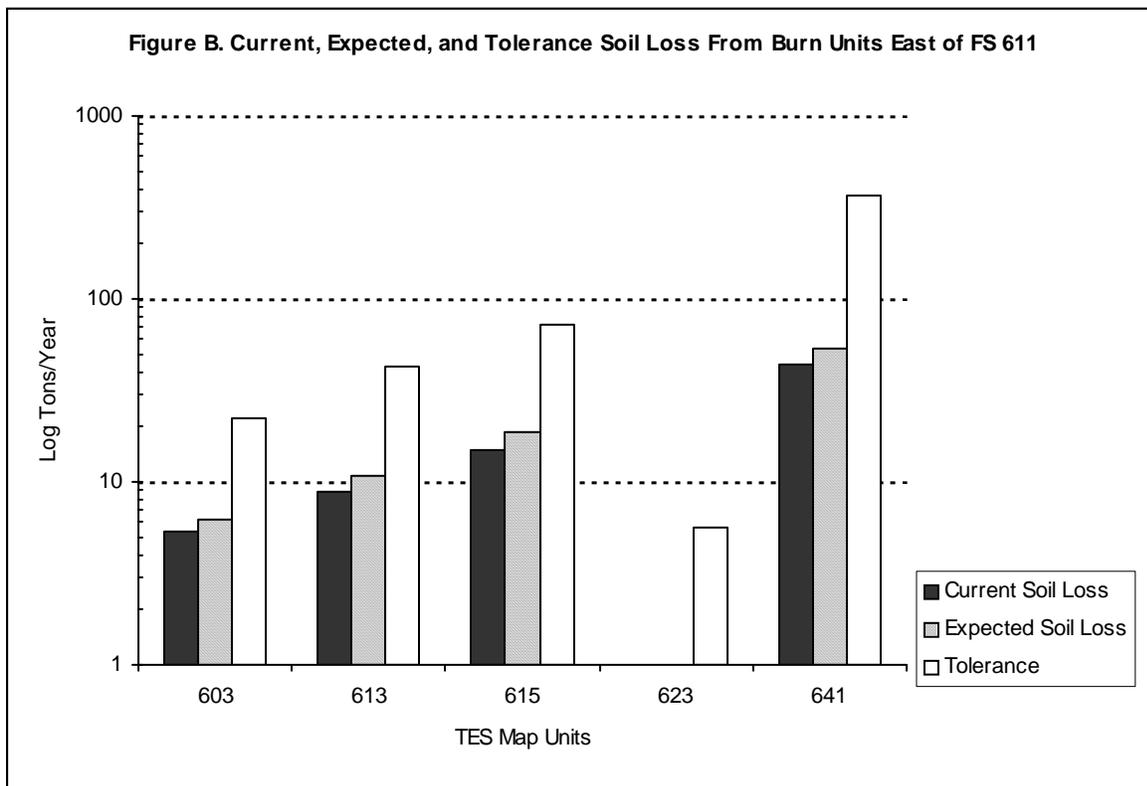
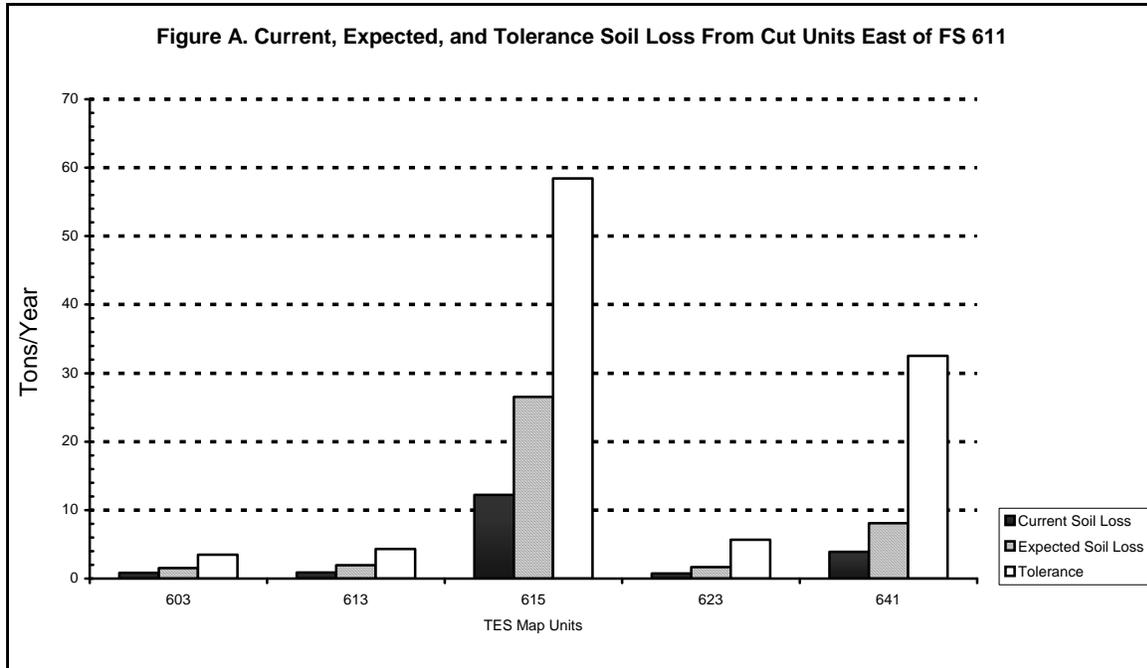


*reduced the number of cattle head months by 30 % on the Central Summer allotment within the project area. This reduction shortened the use season from approximately 5.5 months to approximately 3.5 months. Thus, resulting in increased ground cover and lower soil erosion rates in the project area.*

*The future Apache Trout project located south of the East Rim project area (see map Document 210) will reduce the threat of a catastrophic wildfire spreading from the headwaters of North Canyon into the Saddle Mountain Wilderness and burning over Apache Trout Habitat. The Saddle Mountain Wilderness Trail Improvement project will reconstruct stream crossings and portions of the North Canyon Trail. This will result in less runoff from the trail entering North Canyon and ultimately improve the already high water quality in the stream.*

**Table A. Summary of Current, Expected, and Tolerance Soil Loss from Treatment Areas East of FS 611 (East Rim Vegetation Management Project)**

<b>Treatment Type</b>	<b>Current Soil Loss</b>	<b>Total Expected Soil Loss</b>	<b>Tolerance</b>
<b>Cutting Unit Soil Loss – (25 Hectares)</b>			
Tons/Year	19	40	104
Tons/Hectare/ Year	0.73	1.6	5.6
<b>Burning Unit Soil Loss - (96 Hectares)</b>			
Tons/Year	74	90	507
Tons/Hectare/ Year	0.77	0.93	5.3



Comment 5.21: “The East Rim EA does not address the potential for roadless areas as identified in the roadless area public review process.”

*5.21 Forest Service Response: The issue raised by this comment is beyond the scope of this project. This project is not in any “inventoried roadless areas” (see attached map below).*

Comment 5.22: “The Forest Service failed to Analyze or Disclose the Effects of the East Rim Timber sale on the Apache Trout.”

*5.22 Forest Service Response: See response 5.20 above.*

*Impacts to the Apache trout are addressed in the Wildlife Report and in the BE (Biological Evaluation). Consultation with the US F&WS concerning the effects of the project to Apache trout is complete. A “may affect, not likely to adversely affect” determination has been made for the Apache trout (see EA Page 13, 52, and the Biological Evaluation Document 182 pages 5-9).*

*The East Rim EA (pages 20-21), Ecosystem Management Area Soil and Watershed report (Document 105) and the Final Biological Evaluation (Document 182), cites Best Management Practices that will be incorporated into implementation to protect water quality in the Saddle Mountain Wilderness Area. These measures mitigate concerns for water quality and Apache trout impacts.*

Comment 5.23: “The Forest Service failed to disclose or analyze the effects of logging on the Kaibab squirrel”... “Patton concluded that, ‘the implication of the physical differences between control and treatment plots is that timber harvesting reduced habitat quality’”.... “The EA asserts that Margi Brooks, National Natural Landmark Coordinator, ‘is not concerned with the vegetation management project’s effects on the Kaibab squirrel National Natural Landmark.’ This statement does not constitute an analysis or the required display of analysis as to impacts on the Kaibab Squirrel and its habitat.”

*5.23 Forest Service Response: Since the Kaibab squirrel is a Forest Service Region 3 Sensitive species, potential effects of the proposed action on the squirrel were analyzed in the Biological Assessment (Project Record doc. #160a, pages 14-15). Because the Kaibab squirrel is also a Management Indicator Species (MIS), potential effects of the proposed action were analyzed in the project-specific MIS analysis (doc. #198, pages 15-16). Potential effects of the proposed action on Kaibab squirrel habitat were determined via population trends identified in the Forest-wide MIS analysis (doc. #196, pages 55-57). These effects are summarized in the discussion of early-seral and mid- to late-seral ponderosa pine habitat on pages 39 and 40 of the EA.*

*Please note that in the 1985 study conducted by Patton et al., the timber harvesting method referred to is a seed-tree cut. Management direction has changed since that time to achieve objectives related to ecosystem health, and different harvesting methods are employed. Harvesting methods proposed to improve ecosystem health in the Planning Area include thinning from below, small group selection cuts, and small irregular group shelterwood cuts (EA, pages 5-6). No seed tree cuts are included in the proposed action.*

*Please see the response to comment 4.3 for clarification of the Kaibab squirrel National Natural Landmark designation and its intent.*

Comment 5.24: “The Forest Service failed to disclose the historical occurrences of Mexican spotted owls in the East Rim analysis area.”

*5.24 Forest Service Response: On page 13 of the EA, it is disclosed that, “Mexican spotted owls (MSO) have historically been reported on the North Kaibab Ranger District”. However, there are no confirmed spotted owls in the East Rim Planning Area or within the North Kaibab Ranger District (Project Record doc. #154, page 7). Further, no protected activity centers (owl territories) have been established as per the Mexican Spotted Owl Recovery Team’s instructions for evaluating historical owl locations. Please see the response to comment 5.2 for a more thorough discussion of historical MSO sightings and the non-designation of protected activity centers at historical sites.*

Comment 5.25: The Forest Service Fails to Adequately justify the Purpose and Need for Logging Within Different habitat Types. ...This lack of rational explanation for the proposed logging clearly violates NEPA’s hard look and disclosure requirements.”

*5.25 Forest Service Response: The Forest Plan provides standards and guidelines for vegetation structural stages in different habitat types. The East Rim “Purpose and Need for Action” and “Proposed Action” sections clearly state that the Forest Service will follow vegetative structural stage Forest Plan guidance for working in different habitat types. See pages 3-11 in the East Rim EA.*

Combined Comments 5.26 and 6.1: 5.26: “The East Rim timber sale fails to properly consider Management Indicator Species, especially songbirds”... “The Forest Service fails to provide the detailed and quantified population information for songbird MIS, including pygmy nuthatch and yellow-bellied sapsucker, as required by NFMA.” 6.1: “This project EA must disclose and analyze effects to Management Indicator Species.”

*5.26 and 6.21 Forest Service Response: Page 36 of the EA explains that population trends for Management Indicator Species (MIS), including pygmy nuthatch and yellow-bellied sapsucker, were analyzed at the Forest level in document #196 of the Project Record. Habitat status and trends for MIS were also analyzed at the Forest level (doc. #221). Potential effects of the proposed action on habitat for MIS, given the population trends identified in the Forest-level analysis (doc. #196), were assessed in the East Rim project-specific analysis (doc. #198). The project-specific habitat analysis is summarized in the EA on pages 36-43.*

*Also please see the supplemented East Rim Vegetation Management EA Table 11 below. We summarized the forest-wide MIS population trends from Document 221 (Management Indicator Species For the Kaibab National Forest Report Version 1.0) and included the summaries in Table 11 to help the reader easily understand the species current population trends.*

Comment 5.27: “The habitat analysis done for MIS species (covered in pages 36-43) seems to contradict conclusions in the analysis for migratory birds on pages 43-51”... “If the No Action Alternative produces slightly greater numbers of large diameter trees why is the Forest Service proposing to log these large diameter trees?”... “If the number of large trees is not substantially

different under all of the alternatives does this mean that the Forest Service does not consider the potential loss of 2.5 to 7.2 large trees per acre statistically or structurally significant?"

*5.27 Forest Service Response: What appear to be conflicting conclusions regarding potential effects of the proposed action on habitat for migratory birds and MIS is the result of differing analysis approaches. These approaches utilized different landscape scales and habitat parameters. (Please see pages 3-4 of Project Record document #198, pages 2-4 of doc. #200, and pages 37-38 and 43-45 of the EA for details regarding analysis methods.) In the migratory bird analysis specific variables from broad habitat (forest cover) types were selected for each APIF priority species. These variables are summarized in the analysis in Table C-3 (doc. #200, pages 17 and 18). In the MIS analysis, variables were chosen to correspond to early- and late-seral stages from each habitat type that MIS were selected to represent. See Table C-2 of the MIS analysis (doc. #198, page 5) for a summary of habitat variables.*

*Modeling for the action alternative predicts slightly fewer large trees per acre than the no action alternative (EA page 39; doc.# 198 pages 14 and 15) because small patches of large trees would be removed to assure recruitment of remaining trees into the larger size classes (over 24" in diameter). However, please note that because vegetative treatments proposed in the action alternative would be implemented under Kaibab National Forest Land Management Plan direction there is still an increase in large trees per acre from the existing condition. There is an overlap in standard deviations in number of large trees per acre modeled for the action and no action alternatives (doc. # 198, page 14); therefore, the difference in these alternatives may not be substantial in regard to the large tree component. However, only the action alternative would provide for a forest that is more resilient to disturbance and displays greater structural heterogeneity across the planning area when examined at the patch level.*

Comment 5.28: "An Environmental Impact Statement Must be Prepared"

*5.28 Forest Service Response: An EA is prepared to determine if an EIS is necessary. The deciding official (Kaibab National Forest, Forest Supervisor) will make that decision based on the EA and analysis provided in the project record.*

Comment 5.29: The Cumulative Effects Analysis is Inadequate. ...the Forest Service has stepped outside of the boundaries of utilizing the project record to provide supporting documentation for the content of the EA. In this case, the East Rim EA and the effects of the proposed action cannot be assessed without the entire project record.

*5.29 Forest Service Response: The cumulative effects analysis is adequate. Please see response 5.5*

*The EA summarizes pertinent information contained in the project record and discloses effects and draws conclusion based on the analyses. All documents cited in the EA are incorporated by reference into the EA; and are available to the public upon request. We incorporate by reference to create an analytic document rather than an encyclopedic one.*

Comment 5.30: "The Forest Service Failed to Consider a Reasonable Range of Alternatives."

*5.30 Forest Service Response: See EA pages 15-20 (Alternatives Considered But Dropped From Detailed Analysis, Alternatives Considered in Detail, and Summary of Activities and Effects sections).*

Comment 5.31: “The East Rim Timber Sale Violates the National Forest Management Act (NFMA).”

*5.31 Forest Service Response: All actions proposed in the East Rim EA comply with the KNFLMP. Please see the East Rim EA page 3 section Location and Management Direction; page 5 section Proposed Action; and Page 9 section Purpose and Need.*

Comment 5.32: “The East Rim Timber Sale Fails to Address the Legal and Ecological Significance of the Grand Canyon Game Preserve.”

*5.32 Forest Service Response: See response 5.1 above.*

## **Letter 6. John Horning (Forest Guardians) and Sam Hitt (Wild Watershed)**

Comment 6.1: “This project EA must disclose and analyze effects to Management Indicator Species.”

*6.1 Forest Service Response: See response to comment 5.26 above.*

Comment 6.2: “The statement in the EA (EA, p. 36) that population trends are only to be monitored at the Forest level must therefore be corrected. Site-specific monitoring of management indicator species is clearly required for this project.”

*6.2 Forest Service Response: Potential effects of the proposed action on habitat for each management indicator species (MIS) in the Planning Area have been assessed at the project level (Project Record doc. #198). These assessments were then contrasted to the Forest-level analysis of MIS population trends (doc. #196) to better ascertain population impacts. The East Rim project-specific analysis builds on information presented in the Forest-level analysis of MIS habitat (doc. 221 and see supplemented EA Table 11 below). A summary of the project-specific analysis is provided on pages 38-43 of the EA.*

Comment 6.3: “The EA states that population trend data is available for Northern Goshawk, Mexican Spotted Owl, and Red-naped Sapsucker (EA p. 45). However, this data and the methodologies used to collect this data, were not disclosed. In addition, we could not determine if quantitative population data was collected for the eleven other management indicator species.”

*6.3 Forest Service Response: The discussion on page 45 of the EA pertains to migratory bird species. Because northern goshawk, Mexican spotted owl, and red-naped sapsucker are Management Indicator Species (MIS) as well as migratory birds, population trends for these species and all other MIS were analyzed at the Forest level (Project Record doc. #196). Refer to document #196 for details regarding data and analysis methods used in the population trend analysis. Please see pages 36-43 of the EA for further discussion of MIS.*

*No Forest-level population trend data were available for migratory bird species other than those three (northern goshawk, Mexican spotted owl, and red-naped sapsucker) that are also MIS. For the other APIF priority species of migratory birds, “population trend data was queried from the Breeding Bird Survey (BBS) Data... for the Western BBS Region, the Four Corners Region (Arizona, Utah, New Mexico, and Colorado), and the state of Arizona” (EA page 45). Please see the Forest-level migratory bird analysis (doc. #199) for further detail.*

Comment 6.4: “An Environmental Impact Statement is required because the project may significantly effect the human environment.”

*6.4 Forest Service Response: See response 5.28 above.*

Comment 6.5: “The project may have significant effects on important winter habitat of Golden-crowned Kinglet, Mexican Spotted Owl, Northern Goshawk, Pine Grosbeak and Three toed Woodpecker (EA, p. 51). Approximately half of essential winter habitat for these species will be logged with unknown effects (EA, p. 51 and 52).”

*6.5 Forest Service Response: We wish to clarify that under the proposed action, approximately half of the **potentially** important overwintering habitat within the Planning Area for golden-crowned kinglet, Mexican spotted owl, northern goshawk, pine grosbeak, and three-toed woodpecker would be treated (EA page 51). Note that because overwintering habitat was selected solely by forest cover type, it is not known whether the habitat is actually suitable and is therefore recognized only as having the potential to be important for migratory bird species (Project Record doc. #200). Also note that although treated areas would amount to approximately half of the potential overwintering habitat within the Planning Area (Table 15, page 52 of the EA), these areas would comprise a smaller amount of the total overwintering habitat within the North Kaibab Ranger District (Table E-7, page 21 of doc. #200). This is illustrated for the proposed action (action alternative 2) in the following table:*

Species	Proportion of Potential NKRD Overwintering Habitat in the Planning Area <sup>1</sup>	Proportion of Potential Overwintering Habitat Treated within the Planning Area <sup>2</sup>	Proportion of Total Potential NKRD Overwintering Habitat Treated
Golden-crowned kinglet	59.2%	47.1%	27.9%
Mexican spotted owl	2.6%	57.7%	1.5%
Northern goshawk	5.5%	53.7%	3.0%
Pine grosbeak	6.2%	47.1%	2.9%
Three-toed woodpecker	12.5%	49.0%	6.1%

<sup>1</sup> From Table E-7 page 21 of Project Record doc. #200

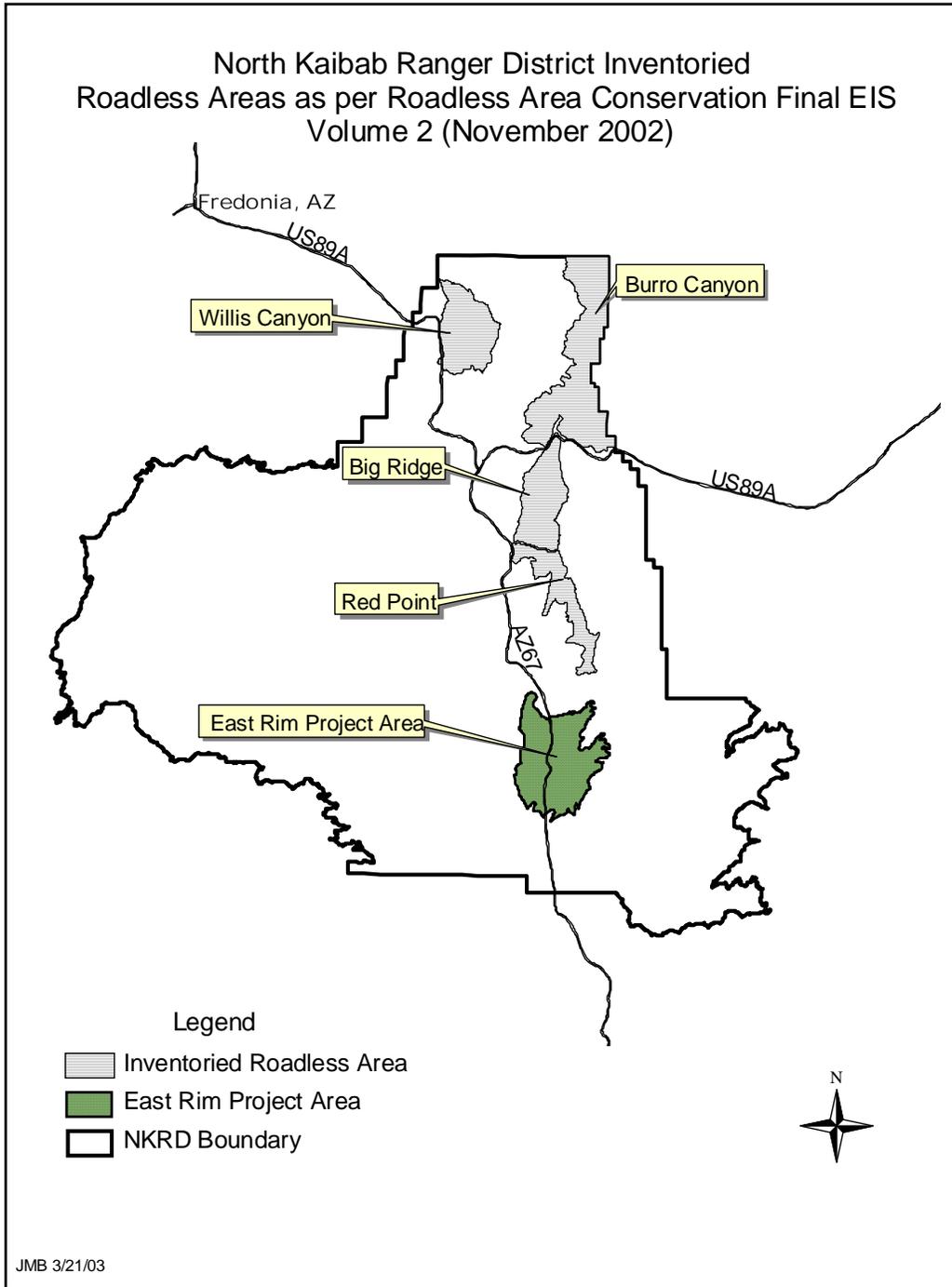
<sup>2</sup> From Table 15, page 52 of the EA

Comment 6.6: The EA fails to demonstrate consistency with the Forest Transportation System Management Policy.”

*6.6 Forest Service Response: The EA is consistent with the Forest Transportation System Management Policy. Please see response 4.8 above.*

Comment 6.7: “The Project EA fails to document compliance with the Migratory Bird Treaty Act and an Executive Order requiring agency action to protect migratory birds.” “The project analysis does not disclose what monitoring efforts, if any, were conducted for the 15 priority species.<sup>3</sup>”

*6.7 Forest Service Response: Please see the EA pages 43-52. Also see the migratory analysis documents #'s 199, 200, 202, 203, and 205. The analysis (doc. #199) utilized Breeding Bird Survey Data for the Western Region, the Four Corners Region (Arizona, Utah, New Mexico, and Colorado), and the state of Arizona to assess population trends for the 15 priority species (EA page 45).*



**Supplemented EA Table 11. Management indicator species of the Kaibab National Forest for Ecosystem Management Area 13, the habitat they were chosen to represent, presence of habitat within the East Rim project area, and forest-wide population trends.**

<i>Management Indicator Species</i>	<i>Habitat Type<sup>1</sup></i>	<i>Habitat Present</i>	<i>Forest-wide MIS Population Trend Summaries (see Document #221)</i>
Aquatic macroinvertebrates	Riparian	--	--
<b>Birds</b>			
Goshawk	Late-seral ponderosa pine	Yes <sup>4</sup>	Appears that the overall goshawk population on the KNF is at least remaining stable and may be increasing on the NKRK.
Hairy woodpecker	Snags in ponderosa pine, mixed conifer and spruce-fir	Yes	Biologists predict that hairy woodpeckers populations on the KNF are stable to increasing.
Lincoln's sparrow	Late-seral, high elevation (>7,000') riparian	--	--
Lucy's warbler	Late-seral, low elevation (<7,000') riparian	--	--
Juniper (Plain) titmouse <sup>2</sup>	Late-seral pinyon-juniper, and snags in pinyon-juniper	--	--
Pygmy nuthatch	Late-seral ponderosa pine	Yes	The overall trend for the KNF is assumed to be reflective of the statewide trend and that pinyon nuthatches populations are stable.
Spotted owl	Late-seral mixed conifer and spruce-fir	Yes	Mexican spotted owl population trends appear to be decreasing on the KNF.
Turkey	Late-seral ponderosa pine	Yes	It appears that turkey populations on the KNF have had an increasing trend based on the AGFD and BBS data.
Red-naped (Yellow-bellied) sapsucker <sup>3</sup>	Late-seral aspen and snags in aspen	Yes	Overall, it is estimated that red-naped sapsucker population trend has been stable or decreasing on the KNF.
Yellow-breasted chat	Late-seral, low elevation (<7,000') riparian	--	--
<b>Mammals</b>			
Mule deer	Early-seral aspen and pinyon-juniper	Yes	Mule deer population trends on the South Zone appears to be following the Statewide trend of decreasing numbers. Conversely, the NKRK appears to be maintaining an increasing trend.
Red squirrel	Late-seral mixed conifer and spruce-fir	Yes	In recent years, red squirrels appear to be undergoing declining population trend on the KNF.
Tassel-eared squirrel	Early-seral ponderosa pine	Yes	It appears that tassel-eared squirrel numbers are in a declining trend on the KNF.

<sup>1</sup>See document # 221 in the Project Record for a complete description of habitat and rationale for MIS selection.

<sup>2</sup>The plain titmouse was split into two species: the oak titmouse along the west coast and the juniper titmouse (*Baeolophus ridgwayi*) in the Southwest <sup>1</sup>(Sibley 2000).

<sup>1</sup> Sibley, D.A. 2000. The Sibley Guide to Birds. Alfred A. Knopf, New York.

<sup>3</sup>The yellow-bellied and red-naped sapsucker are very closely related, forming a cline from more red and less white in the west to less red and more white in the east. (Sibley 2000).

<sup>4</sup>No discussion will follow for species that do not exist or have habitat in the East Rim project area.

**Roads Analysis-**During the fieldwork of this project, it was determined that the roads that needed to be closed were roads that had been previously closed by other decisions. The closure barriers had been driven around or vandalized by forest visitors to reopen the roads. By closing the roads that had previously been designated for closing no additional roads need to be closed.

**ERRATA SHEET**  
**FOR THE**  
**ENVIRONMENTAL ASSESSMENT**  
**EAST RIM VEGETATION MANAGEMENT**

The following typographic errors were discovered in the Environmental Assessment for East Rim Vegetation Management Project. These changes are minor in nature and do not alter any impacts of the selected alternative. The correct words or figures are **highlighted**.

Page 6 – Sixth part of the proposed action **8 MMBF (1 MMBF equals 1,000,000 board feet)**. The document indicates (1 MMBF equals 1,000 board feet).

Page 15 – Item B #7 **individual tree selection**. The document indicates individual group selection.

Page 16 – Alternative 3 **2308 less thinning acres**. The document states that there will be no thinning in the 2321 acres of old growth stands.

Page 28 - Second paragraph under C Environmental Effects **State**. The document discusses Sate of Arizona lands.

Page 32 – Forest Growth Cumulative Effects **wildlife**. The document discusses wildlife risks.

Page 33 – TES Plants –No **negative** effects...The document states, “ No effect”.

Page 35 – Fire and Fuels third paragraph-The Demotte fire occurred **26** years ago. The document indicates that it occurred in the last 20 years.

Page 37 – Footnote #4 in Table 11 should reference Aquatic macroinvertebrates not the Goshawk.

Page 37 – Footnote 2 in Table 11 west **coast...**The document indicates west cost...

Page 51 – Conclusion and Cumulative Effects first paragraph, To generalize...but the differences appear to **be** relatively small. Add “be” to the sentence.

Page 5 & 6 – Clarification –

The proposed action is to thin 2308 acres of old growth of which approximately 350 acres were Land Classification 803 in the 1987 Plan. 1949 acres were classified as old growth in the 6-5-96 amendment to the Plan.

