



# United States Department of the Interior

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In reply refer to:

AESO/SE  
02EAAZ00-2013-F-0190

June 5, 2015

Mr. Scott Russell, Acting Forest Supervisor  
Coconino National Forest  
1824 South Thompson Street  
Flagstaff, Arizona 86001-3600

RE: Biological Opinion – Flagstaff Watershed Protection Project

Dear Mr. Russell:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request and biological assessment (BA) were dated January 8, 2015, and received by us on January 12, 2015. This consultation concerns the potential effects of mechanical thinning and burning activities implemented as part of the Flagstaff Watershed Protection Project (FWPP) on the Flagstaff Ranger District, Coconino National Forest (NF) in Coconino County, Arizona. The Forest Service has determined that the proposed action may affect, and is likely to adversely affect, the threatened Mexican spotted owl (*Strix occidentalis lucida*) and its designated critical habitat.

You also requested that we provide our technical assistance with respect to compliance with the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) for bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). Our documentation of the Forest Service's implementation of minimization measures to reduce the likelihood of take to eagles is included in Appendix C.

This biological opinion (BO) is based on information provided in the January 8, 2015, BA, the June 2014 Draft Environmental Impact Statement (DEIS), meetings, and other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern, forest management and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

## Consultation History

Details of the consultation history are summarized in Table 1.

**Table 1. Summary of Consultation History**

<b>Date</b>	<b>Event</b>
November 2012 -Present	We have worked with the Forest Service on development of FWPP action and the monitoring plan for the Mexican spotted owl. During this time we participated in numerous meetings, field trips, and discussions regarding the project.
April 11, 2013	The Forest Service published a notice of intent to prepare an EIS for the FWPP in the Federal Register and proposed action for comment.
May 16, 2013	We provided comments on the FWPP proposed action.
June 24, 2104	We received your letter requesting comments on June 2014 DEIS.
August 18, 2014	We provided comments on the FWPP DEIS through the Office of the Secretary, U.S. Department of the Interior.
November 20, 2014	We attended a meeting regarding FWPP with Forest Service leadership and the City of Flagstaff.
November 25, 2014	The Forest Service provided a draft BA for review by the FWS.
December 18, 2014	The FWS provided comments to the Forest Service on the draft BA.
January 12, 2015	We received your January 8, 2014, request for formal consultation and the Final BA.
January 20, 2015	We issued a thirty-day letter initiating formal consultation.
June 1, 2015	We submitted a draft BO to the Forest Service for review.
June 2, 2015	We received your comments on the draft BO.

## BIOLOGICAL OPINION

### DESCRIPTION OF THE PROPOSED ACTION

The complete description of the proposed action and effects analysis can be found in your January 2015, BA and other supporting information in the administrative record. These documents are included herein by reference.

During the November 2012 elections, residents of Flagstaff, Arizona approved a \$10 million bond to support watershed and fire risk reduction work within key watersheds on the Coconino NF and State of Arizona lands. Identified on the ballot as the "Forest Health and Water Supply Protection Project," the planning effort on the National Forest segment is now known as the "Flagstaff Watershed Protection Project" (FWPP).

The primary purpose of FWPP is to reduce the risk of high severity wildfire and subsequent flooding in two key watersheds near Flagstaff, Arizona: the Dry Lake Hills (DLH) portion of the Rio de Flag Watershed located north of Flagstaff; and the Mormon Mountain (MM) portion of the Walnut Creek-Upper Lake Mary Watershed located south of Flagstaff (Appendix A, Figure 1). More specifically, there is a need to reduce the potential for crown fires, high intensity surface fires, and to reduce the likelihood of human-caused ignitions. Subsequently, FWPP is a fire risk reduction project with components of forest restoration. Both areas are located on the Flagstaff Ranger District of the Coconino NF. Figure 1 shows the project area locations relative to the watersheds in which they are located. The yellow (DLH) and orange (MM) areas depict the areas analyzed for treatment as part of the FWPP. The project will be implemented over approximately the next 10 years, depending upon funding and the ability to implement burning prescriptions successfully.

### Fuels Reduction and Treatment Summary

The FWPP DEIS analyzed three potential action alternatives to meet the purpose and need of the project. The final proposed action, as described below, contains a blend of these alternatives. The project areas are unique in that they include very steep slopes and mixed conifer forest. Until recently, the Coconino NF has focused on more accessible terrain in the ponderosa pine forest and treatments to reduce fire risk on steep slopes and mixed conifer forests have not occurred, until now.

There are approximately 10,544 acres between the two project areas proposed for thinning and burning activities. Acres could be thinned by helicopter, cable logging, specialized steep-slope equipment, traditional ground-based methods, and hand thinning. Prescribed burning will be included across all treated areas (approximately 8,668 acres). Within the project area, there are also some areas that will not receive any thinning or burning. Table 2 provides a summary of the treated acres and different harvesting methods to be used across the project area.

**Table 2.** Summary of treated acres and harvesting methods in FWPP.

Area	Treated Acres	Helicopter Acres	Cable Logging Acres	Specialized Machinery Acres	Ground Based Acres	Hand Thinning Acres	Burn Only Acres	No Treatment	Total Acres
DLH	5,692	566	414 <sup>1</sup>	250	3,497	498	468	1,876	7,569
MM	2,975	0	0	73	2,320	180	402	0	2,975
<b>Total</b>	<b>8,668</b>	<b>556</b>	<b>414</b>	<b>323</b>	<b>5,817</b>	<b>678</b>	<b>870</b>	<b>1,876</b>	<b>10,544</b>

<sup>1</sup>Of the 414 acres, 114 acres will be harvested via skyline and 300 acres via excaline.

Helicopter logging will be utilized for removing cut trees on approximately 556 acres within the DLH project area. This includes steep slopes within Mexican spotted owl protected activity centers (PACs) and those areas visible from the City of Flagstaff. No helicopter logging will occur on MM.

Cable logging will be utilized to remove cut trees on approximately 414 acres within the DLH, the majority of which would be by excaline (300 acres) and the rest will be skyline (114 acres). Excaline corridors will be shorter (typically less than 300 feet [ft] in length) than skyline corridors, and a machine known as a jammer could also be used, which would remove the need

for cable corridors. No cable logging will occur on MM. Descriptions of the harvesting methods are provided in Chapter 2 of the DEIS (pgs. 46-56).

Approximately 323 acres will be harvested using specialized steep-slope equipment; approximately 250 acres within the DLH and 73 acres on MM. Hand thinning will occur on a total of 678 acres, and an additional 270 acres of steep sloped areas are deferred from treatment for a total of 1,875 acres of deferral.

The treatment descriptions and objectives for FWPP are:

- **Ponderosa pine fuels reduction:** This treatment type includes areas outside of Mexican spotted owl PACs and northern goshawk post-fledgling family areas (PFAs) and nest cores. Mechanical treatments are designed to develop uneven-aged structure and a mosaic of openings and tree groups of varying sizes. Openings would occupy approximately 20 percent of the treatment area. Tree groups would vary in shape, size, density, and number (generally from 0.05 – 0.7 acre in size with residual group basal areas of 20-80 square feet [ft<sup>2</sup>] per acre and 2-40 trees per group). This treatment type will occur on 1,865 acres in the DLH and 766 acres on MM.
- **Ponderosa pine fuels reduction – hand thinning:** This treatment includes steep areas that have low tree density and/or are dominated by smaller diameter trees where the purpose and need can be met through hand felling treatments. Where practical and feasible, treatments would be designed to develop uneven-aged structure and a mosaic of tree groups of varying sizes similar to the treatment described above. This treatment type will occur on 81 acres in the DLH.
- **Mixed conifer fuels reduction (Mexican spotted owl recovery habitat):** These treatments areas include dry mixed conifer areas outside of Mexican spotted owl PACs, replacement nest/roost habitat, and northern goshawk PFAs and nest cores, but include MSO recovery habitat. Mechanical treatment would be designed to develop uneven-aged structure and a mosaic of openings and tree groups of varying sizes. Trees above 24 inches diameter-at-breast height (dbh) would not be cut. Openings would occupy about 10 to 20 percent of the treatment area. Tree groups would vary in shape, size, density, and number (generally less than one acre in size with residual group basal areas of 30-90 ft<sup>2</sup> per acre and 2-50 trees per group). This treatment type will occur on 1,141 acres in the DLH.
- **Mexican spotted owl PAC fuels reduction (wet mixed conifer):** Mechanical treatment within the wet mixed conifer vegetation type would create small openings within aspen stands to promote regeneration. Dead and down material would be piled for burning to reduce the heavy fuel loading and allow for lower-intensity prescribed burning. Piles would be placed in openings to the extent possible to reduce fire damage to large trees. This treatment type will occur on 180 acres on MM.
- **Mexican spotted owl PAC fuels reduction:** Mechanical treatment would create a diversity of patch sizes with minimum patch size of 2.5 acres, provide for 10 percent openings across treatment areas from 0.1 – 2.5 acres in size, and maintain a minimum of

40 percent canopy cover in pine/pine-oak and 60 percent in mixed conifer. Post-treatment, trees greater than 16 inches dbh would contribute at least 50 percent of the stand basal area per Recovery Plan Desired Conditions (USFWS 2012a). Trees above 18 inches dbh would not be cut unless necessary for cable corridor locations. This treatment type will occur on 1,195 acres in the DLH and 1,592 acres on MM.

- **Mexican spotted owl PAC fuels reduction – hand thinning:** This treatment includes steep areas that have low density and are dominated by smaller trees or are located in areas not conducive to steep slope equipment or helicopter or cable yarding operations. Treatments where feasible would treat stands similar to the PAC treatment described above. Otherwise treatments would be thin from below to reduce density and fuel ladders. This treatment type will occur on 202 acres in the DLH.
- **Mexican spotted owl nest habitat fuels reduction – hand thinning:** Hand thinning up to 5 inches dbh would occur within 80 percent of the Schultz Creek PAC nest core in coordination with the FWS (122 acres, DLH). Approximately 20 percent of the nest core would be deferred from treatment in order to maintain denser patches for habitat. Residual basal area would be a minimum of 110 ft<sup>2</sup>, and treatment would maintain a minimum of 60 percent canopy cover in mixed conifer. This nest core would also receive prescribed burning.
- **Mexican spotted owl nest fuels reduction – burn only:** In all nest cores (other than the Schultz Creek nest core, as described above), treatment would consist of low-intensity burning only. Dead and down material in nest cores would be piled by hand and burned. This treatment will occur on 261 acres in the DLH and 402 acres on MM.
- **Mexican spotted owl recovery nest/roost habitat – hand thinning:** Hand thinning up to 9 inches dbh would occur on 72 acres in DLH under this treatment, and dead trees less than 12 inches dbh and down material would be cut and piled by hand for prescribed burning.
- **Mexican spotted owl recovery nest/roost habitat – burn only:** Thirty-seven acres of recovery nest/roost replacement habitat in the DLH would be prescribed burned only (no hand thinning). Snag retention guidelines identified in the Forest Plan would be followed. Treatments would be designed to move the stands towards minimum desired conditions. As such, treatments would result in: a residual basal area of 110 ft<sup>2</sup> in ponderosa pine and 120 ft<sup>2</sup> in mixed conifer; canopy cover of 40 percent in pine/pine-oak and 60 percent in mixed conifer; 12 trees per acre greater than 18 inches dbh; trees from 12-18 inches dbh would comprise over 30 percent of the stands BA; and, trees greater than 18 inches dbh would comprise an additional 30 percent of BA.
- **Mexican spotted owl recovery nest/roost habitat – mechanical thinning:** Mechanical treatment would remove ponderosa pine in a variety of size classes; however, no trees greater than 18 inches dbh would be cut. Treatments would be designed to maintain a minimum residual basal area of 110 ft<sup>2</sup>; canopy cover of 40 percent with 12 trees per acre greater than 18 inches dbh; trees from 12-18 inches dbh would comprise over 30 percent of stands BA; and, trees greater than 18 inches dbh would comprise an additional

30percent of BA. No Gambel oak would be cut. This treatment type will occur on 22 acres on MM.

- **Northern goshawk PFA fuels reduction:** This uneven-aged mechanical treatment would develop uneven-aged structure and a mosaic of tree groups of varying sizes. Openings would occupy 20 percent of the treatment area. Tree groups would vary in shape, size, density, and number: generally from 0.05 – 0.7 acre in size with residual group basal areas of up to 30-90 ft<sup>2</sup> per acre and 2-40 trees per group. This treatment type will occur on 359 acres in the DLH.
- **Northern goshawk nest fuels reduction:** Mechanical treatment designed to develop northern goshawk nest stand conditions consisting of a contiguous over-story of large trees. This treatment type will occur on 100 acres in the DLH.
- **Aspen treatment:** A variety of different treatments would be used to promote and protect aspen health and regeneration, including the removal of post-settlement conifers within 100 ft of aspen clones, prescribed fire, ripping, planting, fencing and/or cutting of aspen to stimulate root suckering. This treatment type will occur on 22 acres in the DLH.
- **Grassland restoration:** Mechanical treatment to remove encroaching post-settlement conifers and restore the pre-settlement tree density and patterns. This treatment type will occur on 60 acres in the DLH.
- **Burn only:** Burn only treatment would remove excessive fuel loading in areas that were previously burned by the Radio Fire. This treatment type will occur on 171 acres in the DLH.
- **Electronic site – structure protection:** These sites are occupied by telecommunication facilities and would be treated to provide a sufficient defensible space around these structures from a wildland fire. Individual trees that are determined to contribute to wildfire risk or pose a hazard to the electronic sites would be removed. The remainder of the sites would receive a thin from below to approximately 20 – 40 ft<sup>2</sup> basal area with the purpose of raising the crown base height and leaving the largest and most fire resistant trees. This treatment will occur on 6 acres in the DLH and 12 acres on MM.
- **No treatment (no new analysis):** These acres include non-treatable areas, including rock faces and boulder fields, and the Orion Timber Sale (approximately 837 acres). Although the Orion Timber Sale is within the project boundary, the treatments for that area were analyzed and authorized under the Jack Smith Schultz Fuels Reduction and Forest Health Restoration Project Decision Notice/Finding of No Significant Impact (2008). No additional treatments within the Orion Timber Sale area are proposed under FWPP. This area includes 1,876 acres within the DLH.

Tables 3 and 4 (below) summarize the harvesting methods for the different treatment types in each of the project areas (DLH and MM).

**Table 3.** The number of acres by harvesting methods for each treatment type in the Dry Lake Hills (DLH) Project Area.

Treatment Type	Ground-based	Hand cut/pile	Helicopter	Cable logging	Burn only	Steep slope Machinery	Total Acres
PIPO <sup>1</sup> Fuels Reduction	1,1613			242		10	1,865
PIPO Fuels Reduction – Hand Thin		81					81
MC <sup>2</sup> Fuels Reduction	626		299	126		90	1,141
PAC Fuels Reduction	793		267			135	1,195
PAC Fuels Reduction – Hand Thin		202					202
MSO <sup>3</sup> Nest Fuels Reduction		122			261		383
MSO Recovery Nest/Roost		72			37		109
PFA Fuels Reduction	299			45		15	359
Goshawk Nest Fuels Reduction	100						100
Aspen		22					22
Grassland	60						60
Burn Only					171		171
Electronic Site	6						6
No Analysis							1,876
<b>Total</b>	<b>3,497</b>	<b>499</b>	<b>566</b>	<b>413</b>	<b>469</b>	<b>250</b>	<b>7,570</b>

<sup>1</sup> PIPO = Ponderosa pine

<sup>2</sup> MC = Mixed conifer

<sup>3</sup> MSO = Mexican spotted owl

**Table 4.** The number of acres by harvesting methods for each treatment type on Mormon Mountain (MM) Project Area.

Treatment Type	Ground-based	Hand cut/pile	Burn Only	Steep slope Machinery	Total Acres
PIPO Fuels Reduction	766				766
MSO PAC Fuels Reduction	1,519			73	1,592
MSO PAC Fuels Reduction – Wet MC		180			180
MSO Nest Fuels Reduction			402		402
MSO Recovery Nest/Roost	22				22
Electronic Site	12				12
<b>Total</b>	<b>2,321</b>	<b>180</b>	<b>402</b>	<b>73</b>	<b>2,975</b>

### Required Transportation System

Truck volume will increase throughout the FWPP treatment period as a result of the thinning operations. Within the DLH and MM areas, approximately 14,000 total truck trips are expected to result from activities authorized by this decision, which equals roughly 2,800 truck trips per year over a five year period.

Within the DLH and MM project areas, the Forest Service has identified system haul roads within and outside the project areas, temporary roads on existing road prisms, temporary roads that need to be rehabilitated for use, relocated system roads to be used as haul roads, and system roads to be decommissioned. The miles of road for each category are summarized in Table 5.

**Table 5.** Miles of road, by type, within the Dry Lake Hills (DLH) and Mormon Mountain (MM) Project Areas.

Road Type	DLH Miles	MM Miles	Total Miles
System haul roads within the project area	18.07	16.46	34.53
System haul roads outside the project area	14.33	18.13	32.46
New temporary haul roads constructed	11.67	0.0	11.67
Temporary roads on existing road prisms	2.75	2.52	5.27
Temporary road rehabilitated	14.43	2.52	16.96
Relocated system road used as haul road	1.57	0.53	2.10
System road decommissioned	4.19	0.19	4.38

### Adaptive Harvesting Matrix

The FWPP proposed to use several specialized harvesting systems in order to accomplish the proposed treatments. To address concerns with the potential of finding a contractor for these specialized harvesting systems, the Forest Service has included an Adaptive Harvesting Matrix, which would allow the latitude to substitute harvesting methods that result in less impact to meet

the approved forest management goals identified for the treatment area. For example, the analysis of effects in the DEIS show that helicopter logging can result in less impact to owls overall than cable logging, but is often more expensive. If, during project implementation, it is found to be more advantageous to treat an area of forest with helicopter logging or hand thinning that is identified in the decision to be treated with cable logging, this would be acceptable and within the scope and range of environmental effects considered in the environmental analysis and is part of the proposed action. This adaptive approach provides flexibility to substitute a less invasive treatment type rather than deferral from treatment in the event a qualified contractor cannot be acquired or other problems are identified. Decisions to modify treatment types shall follow a hierarchy of impacts, moving from the harvesting method with the most impacts to resources to those with less (see Table 6). Additional analysis or a revision to the decision would not be required as the fallback harvesting method would have less impact than the original harvesting method, and all the harvesting methods were included in the analysis performed for the FWPP DEIS. The decision does not authorize a change from a secondary harvesting method to one with more impacts (e.g., from helicopter logging to cable logging). The Forest Service will coordinate with FWS as they proceed with implementation and will document (in a letter to FWS) what the ultimate harvesting method used in the different Mexican spotted owl habitats identified for treatment.

**Table 6.** Adaptive Harvesting Matrix.

<b>Planned Harvesting Method</b>	<b>Secondary Harvesting Method</b>	<b>Third Harvesting Method</b>
Cable Logging	Helicopter Logging	Hand Thinning
Helicopter Logging	Hand Thinning	
Specialized Steep-Slope Machinery	Hand Thinning	

### **Mexican spotted owl Monitoring Plan**

The Mexican spotted owl monitoring plan is designed to evaluate the effects of prescribed fire and mechanical thinning on short-term owl occupancy and reproduction, and key habitat components (as described in the Mexican spotted owl Recovery Plan, Table C.2). This monitoring plan would provide valuable information on the effects of these proposed activities on Mexican spotted owls and their habitat. For FWPP this is of particular interest because fuels reduction treatments within mixed conifer vegetation types or within nest cores have not previously occurred on the Flagstaff Ranger District. The Mexican spotted owl Revised Recovery Plan (USFWS 2012a) (Recovery Plan) states that if thinning and burning are to occur in PACs, monitoring of treatment effect on owls should be conducted. In order to meet this need, the FWS worked with the Forest Service to develop a monitoring plan for this project that would assist in determining the effects of thinning and burning on Mexican spotted owls and their habitat (Appendix B). The monitoring plan includes the details for sample selection, treatment specifics, measurement protocols including timing, and planned analyses. The monitoring plan was developed with FWS in order to meet the Recovery Plan guidelines for conducting fuels treatments in PACs. The proposed monitoring plan would pair treated and untreated (or reference) PACs within DLH and MM portions of the project and compare occupancy rates, reproduction rates, and vegetation (habitat) changes. Reference PACs match the environmental conditions in PACs where treatments are proposed, as closely as possible.

In addition, the Forest Service and FWS worked with Dr. David Huffman of the Ecological Restoration Institute (ERI) of Northern Arizona University to design and implement the vegetation monitoring component of the project and to analyze treatment effects on habitat components, such as tree species composition and structure.

### **Campfire Restriction Order**

The proposed action would also include establishing a permanent campfire restriction order in the DLH portion of the project area to limit the potential for human-caused wildfire. The current temporary campfire restriction order has been in effect since June 2011 (reissued June 2013 for two years), and prohibits building, maintaining, attending, or using a fire, campfire, or stove fire (36 CFR § 261.52(a)). The proposed action would extend this order permanently in the project area.

### **Forest Plan Amendments**

The Forest Service BA states that the proposed action is being conducted under the original Land and Resource Management Plans (LRMP) for the Coconino NF (1987), including the 1996 Region-wide Amendment. The 1996 Forest Plan Amendment incorporated specific language from the 1995 Mexican spotted owl Recovery Plan (USFWS 1995) into standards and guidelines. In 2012, the FWS issued the Revised Recovery Plan for the Mexican Spotted Owl (USFWS 2012a), which includes the best available science and management recommendations concerning the owl, and under which we recommend actions are planned. The Forest Service is in the process of revising the Coconino NF LMRP with the Record of Decision (ROD) for the revised plan anticipated for release in 2016. The Forest Service has proposed two amendments to the Coconino 1987 LRMP that include changes to standards and guidelines for the Mexican spotted owl that would allow the project to be more consistent with the revised Recovery Plan (USFWS 2012a). These amendments now only apply to the 1987 Coconino NF LRMP:

- Amendment 1: The purpose of this amendment would be to facilitate treatment in high-priority locations such as Mexican spotted owl occupied habitat to prevent high-severity wildfire from removing nest/roost habitat. This is based on language in the Mexican Spotted Owl Recovery Plan (USFWS 2012a), which states, “[wildfires] result in the most significant alteration of owl habitat and hence, have the greatest potential for loss of habitat” (USFWS 2012a). The current Forest Plan adopted language from the previous Recovery Plan (USFWS 1995). For this project, the Forest Plan amendment utilizes some of the more updated management direction in the revised recovery plan where it is different than what is currently included in the Forest Plan. More information about this amendment can be found in the DEIS.
- Amendment 2: The current Forest Plan restricts the use of mechanical equipment to slopes less than 40 percent. Amendment 2 removes the restrictive language related to 40 percent slopes and also the language identifying slopes above 40 percent as inoperable in order to allow mechanical harvesting on slopes greater than 40 percent within the project area.

## Conservation Measures

The FWPP BA includes a long list of conservation measures that are all incorporated herein by reference. However, we are only listing below those that directly apply to minimizing effects to the Mexican spotted owl.

- The FWPP project boundary lies within the project boundary for the Four Forests Restoration Initiative (4FRI) as well as other forest thinning and burning projects. Flagstaff Ranger District staff would ensure that all proposed treatments are coordinated to ensure that there are not multiple entries into sensitive habitats (such as Mexican spotted owl PACs) that are split between different project boundaries. In doing so, habitat and noise disturbance to owls in these areas would be minimized.
- The Forest Service will work with the FWS to monitor effects to Mexican spotted owls from the proposed action and report the findings. In addition, in order to meet the requirements of the 2012 LRMP BO, implementation monitoring would include information such as when or if the project was implemented, whether the project was implemented as analyzed (including conservation measures and best management practices), breeding season(s) over which the project occurred, relevant spotted owl survey information, and any other pertinent information about the project's effects on the species. However, treatment activities within PACs would be evaluated through implementation of the FWPP monitoring plan designed by the FWS and Forest Service.
- Treatments would be designed so that thinning activities within each PAC would be completed in one to two breeding seasons. Treatments within PACs may occur during the breeding season for no more than two years; if implementation is not completed at the end of two years, timing restrictions would apply (March 1 – August 31). The Thicket northern goshawk PFA on MM would be treated with the same parameters in conjunction with the PACs it overlaps.
- Activities would not occur within Mexican spotted owl nest cores during the breeding season (March 1 – August 31).
- Initial entry burning and pile burning would primarily occur in PACs during the fall/winter to minimize impacts from smoke on Mexican spotted owls. However, maintenance burning within PACs but outside of nest cores could occur during the breeding season.
- Prescribed fire would be allowed to enter owl nest cores only if it is expected to burn with low fire severity and intensity. Fire lines, check-lines, backfiring, and similar fire management tactics would be used to reduce fire effects and to maintain key habitat elements (e.g. hardwoods, large downed logs, snags, and large trees).
- In Mexican spotted owl recovery habitat, manage for large Gambel oaks (>10 inches diameter-at-root collar [drc]) by removing conifers up to 18 inches dbh that do not meet the "old tree" definition within 30 ft of oak 10 inches drc or larger. Gambel oak would only be cut as necessary to facilitate logging operations (skid trail and landings).

- Coordinate burning spatially and temporally to limit smoke impacts to nesting owls (March 1 to August 31).
- No cable or helicopter logging would occur within Mexican spotted owl nest cores.
- No cable logging would occur within PACs. An implementation guide would be developed in coordination with FWS and Arizona Game and Fish Department (AGFD) to minimize the impacts of helicopter operations (i.e., helicopter landing locations, flight patterns) on nesting birds (Mexican spotted owl, peregrines, eagles, northern goshawks, etc.).
- In areas where large snags are cut for safety purposes, fallen trees would be left on site as needed for wildlife habitat while still lowering overall fuel loadings to meet desired conditions.
- Emphasize retaining old, pre-settlement trees where possible, particularly within Mexican spotted owl recovery nest/roost replacement habitat. Old trees, as defined by Thomson (1940) for ponderosa pine, and mixed conifer species with fire scars would not be targeted for cutting. However, exceptions may be necessary. An example of this would be removing an old tree to address human health and safety concerns and Occupational and Safety Administration (OSHA) regulations where treatments are occurring if these trees are considered to be dangerous. Other examples could include cutting an old tree to accommodate the turning radius of a logging truck, rather than relocating an entire road, or if the tree(s) are located within a cable yarding corridor or temporary road location.
- Treatments within both dry and wet mixed conifer vegetation types would be site-specific in nature and vary according to the diversity of tree species compositions and locations.
- In wet mixed conifer forest types, piles would be placed in openings to the extent possible to reduce fire damage to large trees.
- Biologists would identify patches of snags up to 10 acres in size in advance of treatment unit layout in cable and helicopter logging areas. This would allow for the protection of patches of snags at the ecosystem management area level that could serve as a reserve area for areas/acres where we are unable to maintain snags during operations. Patch locations would be identified with consideration for red squirrel caches.
- Where helicopter logging is used, the Forest Service will consider using patch cuts in order to break up fuels. This would allow for the maintenance of snags outside the patches, but would allow for greater removal of trees (live and dead) and operational safety within the patches.
- Protect snags and logs wherever possible through site prep, implementation planning, and ignition techniques to retain within the project area an average of approximately  $\geq 2$  snags per acre  $>18$  inches dbh and  $\geq 30$  ft in height and  $\geq 3$  logs with  $> 12$  inches mid-

point diameter and  $\geq 8$  ft in length in ponderosa pine; and  $\geq 3$  snags per acre  $>18$  inches dbh and  $\geq 30$  ft in height and  $\geq 5$  logs with  $>12$  inches mid-point diameter and  $\geq 8$  ft in length in mixed conifer and spruce-fir.

- Within the project area, retain an average of approximately  $\geq 2$  trees per acre  $\geq 18$  inches dbh with dead tops, cavities, and lightning strikes wherever possible to provide for replacement snags and cavity nesting/foraging habitat.
- Create snags in key areas identified by biologists (i.e., PACs, recovery nest/roost habitat) where monitoring determines a deficit. Trees would be chosen on a case-by-case basis in order to ensure successful recruitment as snags. Created snags, or a subset of, would be monitored over time to determine if the action was successful (i.e., trees decayed but remained standing, etc.).
- The Forest Service, in coordination with the FWS, shall develop contingency plans in the event of new PACs being established or PAC boundary modifications due to owl movement or habitat changes. Flexibility shall be built into the project (including task orders) so that as owls move or new sites are located, project activities can be modified to accommodate these situations. Minor modifications will be coordinated with FWS.
- The Forest Service shall ensure that all contractors associated with thinning and burning activities, transportation of equipment and forest products, research, or restoration activities are briefed on the Mexican spotted owl, know to report sightings and to whom, avoid harassment of the owl, and are informed as to who to contact and what to do if a Mexican spotted owl is incidentally injured, killed, or found injured or dead on the Coconino NF. If an owl fatality is discovered, the FWS Mexican spotted owl lead will be contacted as soon as possible.
- The Forest Service shall meet annually with the FWS to discuss the upcoming year's thinning and burning plans in Mexican spotted owl habitat and review the past year's thinning and burning activities in owl habitats.

## **ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS**

### **Jeopardy Determination**

In accordance with policy and regulation, the jeopardy analysis in this BO relies on four components in our evaluation for each species: (1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and, (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The jeopardy analysis in this BO places an emphasis on consideration of the range-wide survival and recovery needs of the species and the role of the action area in the survival and recovery of the species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

### **Adverse Modification Determination**

In accordance with policy and regulation, the adverse modification analysis in this BO relies on four components: 1) the *Status of Critical Habitat*, which evaluates the range-wide condition of designated critical habitat for the species in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; 2) the *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; 3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how they will influence the recovery role of affected critical habitat units (CHUs); and, 4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how they will influence the recovery role of affected CHUs.

For purposes of the adverse modification determination, the effects of the proposed Federal action on each species' critical habitat are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the species.

### **STATUS OF THE SPECIES AND CRITICAL HABITAT**

In 1993, the FWS listed the Mexican spotted owl (hereafter, referred to as Mexican spotted owl, spotted owl, and owl) as threatened under the Act. The FWS appointed the Mexican spotted owl Recovery Team in 1993 (USFWS 1993), which produced the Recovery Plan for the Mexican spotted owl in 1995 (USFWS 1995). The FWS released the final Mexican spotted owl Recovery Plan, First Revision (Recovery Plan) in December 2012 (USFWS 2012a). Critical habitat was designated for the spotted owl in 2004 (USFWS 2004).

A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican spotted owl is found in the Final Rule listing the owl as a threatened species (USFWS 1993), the original Recovery Plan (USFWS 1995), and in the revised Recovery Plan (USFWS 2012a). The information provided in those documents is included herein by reference.

The spotted owl occurs in forested mountains and canyonlands throughout the southwestern United States and Mexico (Gutiérrez et al. 1995). It ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several States of Mexico. Although the owl's entire range covers a broad area of the southwestern United States and Mexico, it does not occur uniformly throughout its range. Instead, the Mexican spotted owl occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Known owl locations indicate that the species has an affinity for older, uneven-aged forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico.

In addition to this natural variability in habitat influencing owl distribution, human activities also vary across the owl's range. The combination of natural habitat variability, human influences on owls, international boundaries, and logistics of implementation of the Recovery Plan necessitates subdivision of the owl's range into smaller management areas. The 1995 Recovery Plan subdivided the owl's range into 11 "Recovery Units" (RUs): six in the United States and five in Mexico. In the revision of the Recovery Plan, we renamed RUs as "Ecological Management Units" (EMUs) to be in accord with current FWS guidelines. We divide the Mexican spotted owl's range within the United States into five EMUs: Colorado Plateau (CP), Southern Rocky Mountains (SRM), Upper Gila Mountains (UGM), Basin and Range-West (BRW), and Basin and Range-East (BRE) (Appendix A, Figure 2). Within Mexico, the Revised Recovery Plan delineated five EMUs: Sierra Madre Occidental Norte, Sierra Madre Occidental Sur, Sierra Madre Oriental Norte, Sierra Madre Oriental Sur, and Eje Neovolcanico.

Mexican spotted owl surveys since the 1995 Recovery Plan have increased our knowledge of owl distribution, but not necessarily of owl abundance. Population estimates, based upon owl surveys, recorded 758 owl sites from 1990 to 1993, and 1,222 owl sites from 1990 to 2004 in the United States. The Recovery Plan (USFWS 2012a) lists 1,324 known owl sites in the United States. An owl site is an area used by a single or a pair of adult or subadult owls for nesting, roosting, or foraging. The increase in number of known owl sites is mainly a product of new owl surveys being completed within previously unsurveyed areas (e.g., several National Parks within southern Utah, Grand Canyon National Park in Arizona, Guadalupe National Park in West Texas, Guadalupe Mountains in southeastern New Mexico and West Texas, Dinosaur National Monument in Colorado, Cibola NF in New Mexico, and Gila NF in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (USFWS 2012a). However, we do assume that an increase in the number of areas considered to be occupied is a positive indicator regarding owl abundance.

We are currently working with the Southwestern Region of the Forest Service to conduct a pilot study for the population monitoring recommended in the Revised Recovery Plan (USFWS 2012a). The effort to conduct this work occurred during the 2014 breeding season and has continued into the 2015 breeding season, but only on National Forest System (NFS) lands. The Recovery Team, Forest Service, and the Rocky Mountain Bird Observatory (RMBO, contractor) are continuing to collect data and develop a strategy for incorporating additional lands (e.g., National Park Service, Bureau of Land Management, Department of Defense) into the monitoring. Currently, based on the work conducted by the Forest Service and RMBO, we have a process for conducting rangewide population monitoring, but we need to further develop the potential strategy for collecting rangewide habitat monitoring data.

Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: (1) the historical alteration of its habitat as the result of timber-management practices; and, (2) the threat of these practices continuing. The danger of stand-replacing fire was also cited as a looming threat at that time. Since publication of the original Recovery Plan (USFWS 1995), we have acquired new information on the biology, threats, and habitat needs of the Mexican spotted owl. Threats to its population in the U.S. (but likely not in Mexico) have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire (USFWS 2012a). Recent forest management has moved away from a commodity focus and now emphasizes sustainable ecological function and a return toward pre-settlement fire regimes, both of which have potential to benefit the spotted owl. However, as stated in the revised Recovery Plan (USFWS 2012), there is much uncertainty regarding thinning and burning treatment effects and the risks to owl habitat with or without forest treatment as well. Therefore, efforts to reduce fire risk to owls should be designed and implemented to evaluate the effects of treatments on owls and retention of or movement towards desired conditions.

Southwestern forests have experienced larger and more severe wildland fires from 1995 to the present, than prior to 1995. Climate variability combined with unhealthy forest conditions may also synergistically result in increased negative effects to habitat from fire. The intensification of natural drought cycles and the ensuing stress placed upon overstocked forested habitats could result in even larger and more severe fires in owl habitat. Several fatality factors have been identified as particularly detrimental to the Mexican spotted owl, including predation, starvation, accidents, disease, and parasites.

Historical and current anthropogenic uses of Mexican spotted owl habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities have the potential to reduce the quality of owl nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout the range of the owl and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing throughout the Southwest, especially in meadow and riparian areas. There is anecdotal information and research that indicates that owls in heavily used recreation areas are much more erratic in their movement patterns and behavior. Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to owls through habitat modification and disturbance. As the human population grows in the southwestern United States, small communities within and adjacent to wildlands are being developed. This trend may have detrimental effects to spotted owls by further fragmenting habitat and increasing disturbance during the breeding season.

Several fatality factors have been identified as particularly detrimental to the Mexican spotted owl, including predation, starvation, accidents, disease, and parasites. For example, West Nile Virus also has the potential to adversely impact the Mexican spotted owl. The virus has been documented in Arizona, New Mexico, and Colorado, and preliminary information suggests that owls may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of spotted owls and the lack of intensive monitoring of banded birds, we will most likely not know when owls contract the disease or the extent of its impact to the owl range-wide.

Currently, high-severity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic wildland fire is probably the greatest threat to the Mexican spotted owl within the action area. As throughout the West, fire severity and size have been increasing within this geographic area. Landscape level wildland fires, such as the Rodeo-Chediski Fire (2002), the Wallow Fire (2011), and the Whitewater-Baldy Complex (2012) have resulted in the loss of tens of thousands of acres of occupied and potential nest/roost habitat across significant portions of the Mexican spotted owl's range. Although owls will forage in burned areas,

Finally, global climate variability may also be a threat to the owl. Changing climate conditions may interact with fire, management actions, and other factors discussed above, to increase impacts to owl habitat. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days (Dettinger and Cayan 1995, Dettinger and Diaz 2000, Stewart et al. 2004). Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations (Smith et al. 2000, Reiners et al. 2003). The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats (IPCC 2007, Cook et al. 2004, Breshears et al. 2005, Mueller et al. 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, and to invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

### *Critical habitat*

The FWS designated critical habitat for the Mexican spotted owl in 2004 on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (USFWS 2004). Within the designated boundaries, critical habitat includes only those areas defined as protected habitats (defined as PACs and unoccupied slopes >40 percent in the mixed conifer and pine-oak forest types that have not had timber harvest in the last 20 years) and restricted (now called "recovery") habitats (unoccupied owl foraging, dispersal, and future nest/roost habitat) as defined in the 1995 Recovery Plan (USFWS 1995). The PCEs for Mexican spotted owl critical habitat were determined from studies of their habitat requirements and information provided in the Recovery Plan (USFWS 1995). Since owl habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs identified for the owl within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the owl's habitat needs for nesting, roosting, foraging, and dispersing are:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 to 45 percent of which are large trees with dbh (4.5 ft above ground) of 12 inches or more;
- A shade canopy created by the tree branches covering 40 percent or more of the ground;
- Large, dead trees (snags) with a dbh of at least 12 inches.
- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and,
- Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

The PCEs listed above usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest-type productivity, and plant succession. These PCEs may also be observed in younger stands, especially when the stands contain remnant large trees or patches of large trees. Certain forest management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

Steep-walled rocky canyonlands occur typically within the Colorado Plateau EMU, but also occur in other EMUs. Canyon habitat is used by owls for nesting, roosting, and foraging, and includes landscapes dominated by vertical-walled rocky cliffs within complex watersheds, including many tributary side canyons. These areas typically include parallel-walled canyons up to 1.2 miles (2 kilometers) in width (from rim to rim), with canyon reaches often 1.2 miles (2 kilometers) or greater, and with cool north-facing aspects. The PCEs related to canyon habitat include one or more of the following:

- Presence of water (often providing cooler and often higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, piñon-juniper, and/or riparian vegetation;
- Canyon walls containing crevices, ledges, or caves; and,
- High percent of ground litter and woody debris.

Overall, the status of the owl and its designated critical habitat has not changed significantly range-wide in the U.S. (which includes Utah, Colorado, Arizona, New Mexico, and extreme southwestern Texas); based upon the information we have, since issuance of the 2012 LRMP BO for the Coconino NF (USFWS 2012b). What we mean by this is that the distribution of owls continues to cover the same area, and critical habitat is continuing to provide for the life history needs of the Mexican spotted owl throughout all of the EMUs located in the U.S. We do not have detailed information regarding the status of the Mexican spotted owl in Mexico, so we cannot make inferences regarding its overall status.

However, this is not to say that significant changes have not occurred within the owl's U.S. range. Wildland fire has resulted in the greatest loss of PACs and critical habitat relative to other actions (e.g., such as forest management, livestock grazing, recreation, etc.) throughout the U.S. range of the Mexican spotted owl. These wildland fire impacts have mainly impacted Mexican spotted owls within the UGM EMU (e.g., Slide and Schultz Fires on the Coconino NF, Rodeo-Chediski and Wallow Fires on the Apache-Sitgreaves NF and Whitewater-Baldy Complex on the Gila NF) and BRW EMU (e.g., Horseshoe 2 Fire on the Coronado NF); but other EMUs have been impacted as well (SRM EMU, the Santa Fe NF by the Las Conchas Fire, CP EMU by the Warm Fire). However, we do not know the extent of the effects of these wildland fires on actual owl numbers.

## **ENVIRONMENTAL BASELINE**

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions that are contemporaneous with the consultation process. The environmental

baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The environmental baseline descriptions provided below are a summary of the available information. A complete description of the environmental baseline for each species can be found in the administrative record for this consultation.

The project area is dominated by ponderosa pine and mixed conifer forest communities. Inclusions of aspen, meadows, ephemeral drainages, and springs also occur across the analysis area. Southwestern ponderosa pine and dry mixed conifer forest are fire-adapted ecosystems with relatively frequent fire return intervals dominated by low severity surface fire. The project area also includes wet (mesic) mixed conifer forest which is likely less adapted to frequent fire.

### Description of the action area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR section 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. The action area for this BO is defined as the DLH and MM areas proposed for mechanical thinning, prescribed burning, and other treatments (collectively the “treatment area”) and anywhere outside of this treatment footprint that other project-related effects could spread (such as smoke effects, as analyzed in the BA).

#### A. Status of the species and critical habitat within the action area

The FWP analysis area lies entirely within the UGM EMU. Within the overall project area, there are ten PACs totaling 3,954 acres, but not all of each PAC lies completely within the project area. Approximately 20 percent of the total PAC acreage (~784 acres) within FWPP consists of nest cores. PAC and nest core acres within the project areas are listed in Table 7. Additional PACs, not listed in Table 7, that are located within 0.5 mile of the project include: Archie’s (#030405034), Red Raspberry (#030405003), Dairy Spring (#030405007), and Aspen Spring (#030402035).

**Table 7.** Summary of acreages of PACs and core areas in the Dry Lake Hills (DLH) and Mormon Mountain (MM) project areas.

Project Area	PAC	PAC Acres	Core Area Acres
DLH	Schultz Creek (#030402006)	659	122
	Mount Elden (#030402002)	630	102
	Orion Spring (#030402035)	328	150
	Weatherford 2 (#030402039)	163	8
MM	De Toro’s (#030405033)	663	185
	Lockwood (#030405041)	149	0
	Moore Well-Rock Dike (#030405011)	21	7
	Mormon Mountain (#030405051)	148	0

<b>MM</b>	<b>Mormon Mountain North</b> (#030405008)	611	109
	<b>Weimer Springs</b> (#030405032)	582	101
	<b>Total Acres</b>	<b>3,954</b>	<b>784</b>

All MSO habitats within the project area and a 0.5 mile buffer were surveyed in 2013 and 2014. In addition, seven PACs that may be used as reference PACs for the effects monitoring (see Appendix B), were also surveyed. Surveys were conducted according to FWS protocol (USFWS 2012a). All owl responses were associated with existing PACs. This survey data is summarized in Table 8.

**Table 8.** Survey results for PACs within and adjacent to the FWPP project area.

<b>PAC</b>	<b>2013 Survey Results</b>	<b>2014 Survey Results</b>
DeToros	Female – Non-nesting	No Information
Lockwood	Pair Occupancy – Nesting unk.	Pair Occupancy – Nesting unk.
Moore Well-Rock Dike*	Pair Occupancy – Nesting unk.	Pair – Two Young Fledged
Mormon Mountain	Absent	No Information
Mormon Mountain North	Absent	No Information
Weimer Springs	Pair Occupancy – Nesting unk.	No Information
Schultz Creek	Pair Occupancy – Nesting unk.	Pair Occupancy – Nesting unk.
Mount Elden	Pair Occupancy – Non-nesting	Pair Occupancy – Nesting unk.
Orion Spring	Pair Occupancy – Nesting unk.	Pair Occupancy – Nesting unk.
Weatherford 2	Pair – Two Young Fledged	Pair Occupancy – Nesting unk.
Aspen Spring	Pair – Two Young Fledged	Pair Occupancy – Nesting unk.
Snowbowl*	Pair Occupancy – Non-nesting	Pair Occupancy – Nesting unk.
Little Spring*	Pair – Two Young Fledged	Pair – Two Young Fledged
Red Raspberry*	Absent	No Information
Mayflower Tank*	Pair Occupancy - # Fledged unk.	Pair – Two Young Fledged
Dairy Springs*	Pair Occupancy – Non-nesting	Male
East Bear Jaw*	Absent	Absent
Archies	No Information	No Information

\*Reference PACs, not located within FWPP Project Area

There are 2,975 acres of recovery (suitable but unoccupied) habitat within FWPP. The acreages are detailed in Table 9. Recovery habitat is characterized by basal area and percent of basal area of trees 12-18 inches dbh and trees per acre greater than 18 inches dbh as well as the amount of coarse woody debris and snags greater than 18 inches dbh. Based upon information in the Silviculture Specialist's Report, recovery habitat exceeds basal area minimums with adequate number of large trees with the exception of recovery nest roost replacement habitat in mixed conifer in the DLH area, which is lacking in large trees > 18 inches dbh.

The Recovery Plan (USFWS 2012a, Table C.3) calls for managing 25 percent of mixed conifer recovery habitat and 10 percent of pine oak recovery habitat as nest/roost replacement habitat across the landscape. Within this 25 percent, the Recovery Team used Forest Service stand data to develop goal parameters of minimum basal area of 120 ft<sup>2</sup>/ac with at least 12 trees per acre greater than 18 inches dbh in mixed conifer, and a minimum basal area of 110 ft<sup>2</sup> with at least 12

trees per acre greater than 18 inches dbh in pine oak. For the pine -oak, nest/roost stands were identified in previous decisions or as part of the 4FRI. For the mixed conifer, nest/roost stands have been identified through previous decisions and as part of a Forest Service District-wide Assessment done in cooperation with the FWS. Approximately 131 acres of recovery nest/roost replacement habitat occur within the project. Active Crown Fire Potential within recovery nest/roost replacement habitat is 28 percent in DLH and 95 percent in MM project area.

Based upon analyses completed by the Forest Service, current conditions are inhibiting the recruitment of old-growth trees, thereby not favoring the creation of large snags in stands and accumulation of large down logs on the forest floor over time. Current data for many of these areas indicates that there is an excess supply of coarse woody debris due to the exclusion of frequent, low-severity fire, which can increase the likelihood of high-severity fire within owl recovery habitat. In addition, the high number of smaller diameter (<12 inches dbh) trees per acre is preventing the development of a structurally and biologically diverse assemblage of tree and understory species. Lack of stand diversity excludes conditions that support a wide variety of prey species for spotted owls.

**Table 9.** Acreages of Mexican spotted owl recovery habitat, including nest/roost replacement habitat within the FWPP area.

Owl Habitat Category	Project Area	Recovery Habitat	Recovery nest/roost Habitat	Total Acres Recovery Habitat
Mixed conifer Recovery Habitat Outside of PACs	DLH Acres	1,800	109	1,909
	MM Acres	0	0	0
	<b>Total Acres</b>	1,800	109	1,909
Pine-Oak Recovery Habitat Outside of PACs	DLH Acres	277	0	277
	MM Acres	767	22	789
	<b>Total Acres</b>	1,044	22	1,066
	<b>Total Acres</b>	<b>2,844</b>	<b>131</b>	<b>2,975</b>

One of the primary threats to Mexican spotted owls is the potential loss of habitat from high-severity fire effects. Crown fire potential was analyzed for the DLH and MM using data generated from modeling performed using FlamMap 5.0 (see pages 23-24 in the BA). Modeling results indicated that approximately 65 percent of the PAC habitat in the DLH and 66 percent in the MM project area was rated as having an active crown fire potential, indicating that wildfire activity would result in more severe fire effects to the habitat than would occur if the area were operating under a natural fire regime. Approximately 54 percent of the mixed conifer and 49 percent of the ponderosa-pine oak recovery habitat in the DLH project area and 81 percent of the ponderosa pine-oak recovery habitat in the MM project area were rated as having an active crown fire potential.

#### *Critical Habitat*

The FWPP project area is located within Mexican spotted owl critical habitat unit (CHU) UGM 14. This CHU encompasses approximately 55,533 total acres, but not all of this area is considered to be critical habitat. Only Federal lands that meet the definition of protected or

recovery habitat within the CHU are considered to be critical habitat, unless otherwise exempted. Within the FWPP project area, there are approximately 6,929 acres of protected (3,954 acres) and recovery (2,975 acres) habitat that are critical habitat. Table 10 describes the acres of critical habitat within the DLH and MM project areas and for the entire FWPP area. These acres completely overlap with the PAC and recovery habitat acres described above.

**Table 10.** Designated critical habitat acres within FWPP.

Owl Habitat Category	Dry Lake Hills Project Area	Mormon Mountain Project Area	Total Acres
PAC	1,780	2,174	3,954
Recovery (Pine-Oak)	277	789	1,066
Recovery (Mixed conifer)	1,909	0	1,909
<b>Total Acres</b>	<b>3,966</b>	<b>2,963</b>	<b>6,929</b>

### **B. Factors affecting the species and critical habitat within the action area**

The action area consists primarily of National Forest System (NFS) lands, and there are few State, tribal, or private actions impacting the Mexican spotted owl or its critical habitat. Key factors that have affected the owl within the action area are vegetation removal activities associated with fuels reduction and forest restoration projects, fire and fuels management, maintenance of vegetation along utility corridors, lands projects involving infrastructure repair/maintenance, recreation, and wildfire. The projects have all included conservation measures to minimize effects to the owl and its habitat.

The FWPP project area is of high scenic, cultural, wildlife, and recreational value. Public use of the project area is very heavy, with many heavily-used trails (for both motorized and non-motorized use), camping areas, and rock climbing areas. The area also has religious significance to several Native American tribes in the region.

There is overlap between the 4FRI DEIS and FWPP DEIS analysis area. Those areas that were initially analyzed by the 4FRI DEIS were included in this planning effort to address additional treatment options (such as treatments on steep slopes), but not carried forward into the 4FRI FEIS, the Record of Decision, or included in the 4FRI biological opinion (#22140-2011-F-0145). The Mount Elden/Dry Lake Hills (MEDL) Recreation Planning Project is also underway and overlaps a majority of the project area within the DLH. While the purposes of the MEDL and FWPP projects differ, consistency between the proposed actions will be maintained as each project moves through the analysis process to ensure there are no conflicts between proposals. Both the 4FRI project and the MEDL projects have or will receive separate section 7 consultation under the Act.

Of the 10,545 acres within the DLH and MM project areas, approximately 1,872 acres within the general project boundary are already covered under two previous NEPA decisions: Jack Smith/Schultz (2009) and Eastside (2007) Fuels Reduction and Forest Health Restoration Projects. The treatable areas covered under those decisions are either currently being implemented or will be implemented in the near future. For example, the Orion Task Order (from the Jack Smith/Schultz Decision, 2009) is within the project boundary in the DLH area and

is anticipated to be treated through the 4FRI contractor. Some areas within the Jack Smith/Schultz project area were either determined to be untreatable by ground-based equipment or were designated as No Treatment during that planning effort due to steep slopes and accessibility issues; those areas were reanalyzed in the FWPP DEIS.

## **EFFECTS OF THE ACTION**

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

### ***Effects of the action on the Mexican spotted owl and its habitat***

The following is a discussion of the potential effects from activities associated with FWPP on the Mexican spotted owl. Below we summarize the potential effects of thinning and prescribed burning, transportation, and disturbance (noise, smoke) on owls and their habitat.

#### **Thinning and Prescribed Burning**

Thinning and burning treatments were designed to move toward desired conditions as identified in the Recovery Plan (USFWS 2012a). Treatments follow the Recovery Plan (USFWS 2012a) in protected and recovery habitats with three exceptions: 1) trees greater than 24 inches dbh would be cut for cable corridors in recovery habitat; 2) work would need to be completed in PACs but outside of nest cores during the breeding season to reduce the duration of disturbance from implementation; and 3) hand thinning of trees less than 5 inches dbh in 80 percent of the Schultz Creek nest core and prescribed burning in the following nest cores within the project boundary outside of the Mexican spotted owl breeding season would be allowed: De Toro's, Lockwood, Moore Well-Rock Dike, Mormon Mountain, Mormon Mountain North, Weimer Springs, Schultz Creek, Mount Elden, Orion Spring, and Weatherford 2.

Table 11 summarizes the acres of each treatment type in PAC and recovery habitat. Table 12 summarizes the acres of proposed harvest methods by PAC and recovery habitat. All of the 3,954 acres of protected (PAC) habitat within the FWPP project area are proposed to be treated, including 122 acres of the Schultz Creek PAC nest core (thin up to 5 inches dbh, hand pile and burn down and dead wood). The remaining 663 acres of nest cores would be burn only. In recovery habitat, 2,698 acres would be treated with mixed conifer and ponderosa pine fuels reduction treatments. Of these recovery habitat acres, 131 acres are identified as recovery nest/roost replacement habitat and would be treated to improve their ability to provide nest/roost habitat. Ninety-four acres of recovery nest/roost replacement habitat would be hand thinned (uneven-aged prescription) and broadcast burned. The remaining 138 acres of recovery habitat and 37 acres of recovery nest/roost replacement habitat would be burned with no thinning.

**Table 11.** Acres of proposed treatment type in Mexican spotted owl habitat.

<b>Treatment</b>	<b>PAC Acres</b>	<b>Recovery Habitat Acres</b>
Mixed Conifer Fuels Reduction	0	1,141
Mixed Conifer Fuels Reduction Burn Only	0	138
Ponderosa Pine Fuels Reduction Hand Thinning	0	14
Ponderosa Pine Fuels Reduction	0	1,265
PAC Fuels Reduction (wet mixed conifer)	180	0
PAC Fuels Reduction	2,787	0
PAC Fuels Reduction- Hand Thinning	202	0
PAC Core Area Fuels Reduction-Burn Only	663	0
PAC Core Area Fuels Reduction- Hand Thinning	122	0
Recovery Nest/Roost Hand Thin	0	72
Recovery Nest/Roost Mechanical Thin	0	22
Recovery Nest/Roost Burn Only	0	37
<b>Totals</b>	<b>3,954</b>	<b>2,689</b>

**Table 12.** Acres of proposed harvest method by PAC and recovery habitat.

<b>PAC/Habitat Category</b>	<b>Burn Only</b>	<b>Excaline<sup>1</sup></b>	<b>Ground Based</b>	<b>Hand Thin</b>	<b>Helicopter</b>	<b>Skyline<sup>1</sup></b>	<b>Steep Slope</b>	<b>Total</b>
DeToros PAC	185*	0	330	120	0	0	28	663
Lockwood PAC	0	0	137	0	0	0	12	149
Moore Well-Rock Dike PAC	7*	0	14	0	0	0	0	21
Mormon Mountain PAC	0	0	122	26	0	0	0	148
Mormon Mountain North PAC	110*	0	434	34	0	0	32	611
Weimer Springs PAC	101*	0	481	0	0	0	0	582
Schultz Creek PAC	0	0	312	110 122*	83	0	32	659
Mount Elden PAC	102*	0	256	92	127	0	53	630
Orion Spring PAC	150*	0	128	0	0	0	49	328
Weatherford2 PAC	8*	0	98	0	57	0	0	163
<b>Total Acres in PAC</b>	<b>663</b>	<b>0</b>	<b>2,313</b>	<b>504</b>	<b>267</b>	<b>0</b>	<b>206</b>	<b>3,954</b>
Recovery Habitat	138	12	1890	14	299	114	90	2557

<b>PAC/Habitat Category</b>	<b>Burn Only</b>	<b>Excaline<sup>1</sup></b>	<b>Ground Based</b>	<b>Hand Thin</b>	<b>Helicopter</b>	<b>Skyline<sup>1</sup></b>	<b>Steep Slope</b>	<b>Total</b>
Recovery Nest/Roost	37	0	22	72	0	0	0	131
<b>Total Acres in Recovery</b>	<b>175</b>	<b>12</b>	<b>1,913</b>	<b>86</b>	<b>299</b>	<b>114</b>	<b>90</b>	<b>2,689</b>
<b>Overall Total</b>	<b>838</b>	<b>12</b>	<b>4,227</b>	<b>590</b>	<b>566</b>	<b>114</b>	<b>296</b>	<b>6,643</b>

<sup>1</sup> Acres treated by Skyline/Excaline harvest method include cable corridors

\* Nest/roost core area acres

Thinning and/or prescribed burning activities in PAC and recovery habitat may indirectly affect Mexican spotted owls by affecting the habitat structure including snags, downed logs, woody debris, multi-storied canopies, and dense canopy cover. Under the proposed action, all treatments in PAC and recovery habitats would be designed to move toward the desired conditions as identified in the Recovery Plan (USFWS 2012a). The Forest Service conducted models that show that the treatments would move toward development of desired conditions both immediately after treatment and continuing over the next 20 to 40 years. Treatments would be designed to maintain large snags and large logs and develop trees into the larger size classes. Snags would not be targeted for removal except where necessary for cable corridor locations and safety requirements in areas where trees would be felled by hand and removed by cable or helicopter. Trees greater than 18 inches dbh would not be cut in PAC or recovery nest/roost habitat, and trees greater than 24 inches dbh would not be cut in recovery habitat except where necessary for cable corridor locations.

Skyline logging uses a system of cables to drag whole logs from the cutting unit to a roadside landing. It is used on sites that are too steep for ground based operations. Roughly parallel "corridors" for the skyline are placed every 100 to 140 ft. These corridors are approximately 12 ft wide and all trees must be removed from the corridor to facilitate safe removal of the logs. Much of the area to be logged this way contains large (greater than 24 inches dbh) pre-settlement trees and snags. The Forest Service has estimated that approximately 88 acres (3 percent) of recovery habitat in the project area would be denuded by the cable/skyline logging. None of these 88 acres is located in recovery nest/roost replacement habitat. The Recovery Plan (USFWS 2012a) recommends retaining trees greater than 24 inches dbh in recovery habitat. The Forest Plan amendment that would allow for this would allow for the removal of approximately 108 trees greater than 24 inches dbh in the DLH. No cable corridors are proposed in PAC habitat in DLH or on MM, or in recovery habitat on MM.

In addition, cable and helicopter logging requires that all hazard trees be removed from the entire area that would be cable or helicopter logged to provide for safety of personnel on the ground outside of protected (closed cab) machinery. Conversely, discussions with a logging company helicopter pilot during a FWPP site visit indicated few snags would need to be removed with the exception of areas around log landings (email from Robert Rich 11/12/2014). To minimize the removal of snags, the Forest Service has agreed to identify patches of snags and live trees up to 10 acres in size that will not be treated in areas proposed for cable and helicopter logging to allow for retention of snags in these areas. Not taking into account the retention of snags within these patches, there could be approximately 267 acres (7 percent of the protected habitat within the project) in protected habitat and 425 acres of recovery habitat acres (14 percent of the

recovery habitat within the project) where all snags could be removed in order to provide for worker safety. Despite the removal of these snags, Forest Service modeling indicates that mixed conifer protected and recovery habitats would continue to meet LRMP desired conditions for snag numbers. There would be no change to snag densities from cable and helicopter logging in ponderosa pine-Gambel oak recovery habitat as these activities are not proposed within this habitat.

Under the proposed action, the removal of snags and trees greater than 24 inches dbh would occur. Again, Forest Service modeling indicates that following treatment there will still be enough large trees to meet the LRMP desired conditions. Conservation Measures such as retaining snag patches, large trees with dead tops, cavities, and lightning strikes wherever possible will protect existing snags and provide for replacement snags. Monitoring would allow for the creation of additional snags in those areas determined to be deficient.

A benefit of cable and helicopter logging would be the reduction in ground disturbance from heavy machinery on steep slopes, which would minimize soil compaction, rutting, and/or exposure of bare mineral soil. The protection of soil on these steep slopes should allow for quicker herbaceous recovery post-logging.

Prescribed fire, the deliberate application of fire to reduce forest fuels and reestablish fire as a process, as stated above, is also part of the proposed action. Effects from prescribed burning in PAC and recovery habitats are difficult to quantify due to the uncertainty inherent in prescribed fire. Design features are in place to minimize the loss or modification of large trees, snags, and logs during all prescribed burning treatments. In the process of applying fire deliberately to this landscape, past experience and research have shown that large logs, snags, large trees, and Gambel oaks – all key habitat components of Mexican spotted owl habitat - may be lost or damaged during these activities (Horton and Mannan 1988).

Randall-Parker and Miller (2002) monitored the effects of prescribed fire in ponderosa pine forest on snags, down logs, Gambel oaks, and old ponderosa pine trees at five sites on two national forests (Coconino and Kaibab) and a national monument (Walnut Canyon). All burns were conducted in the fall. At all sites except one, some snags were lined (i.e., duff and debris raked away from the base of the dead tree). Results included the following:

- Twenty-one percent of all snags monitored were consumed by fire or converted to logs, and the range of loss across sites was 12 to 38 percent. Nine snags were also created by fire: six of these were old-growth trees that were converted from live to dead trees and two were Gambel oaks.
- Fifty-three percent of all logs monitored were consumed by fire (lost). Log loss did not differ by species.
- Six percent of the 282 Gambel oaks greater than ten inches dbh were lost, and loss ranged from zero to nine percent across the five sites.
- Old growth tree loss across the sites ranged from zero to six percent.

Another study conducted as part of the Birds and Burns Network (Saab et al. 2006) also evaluated the magnitude of change in the quantities of downed wood, snags, and trees within one year after prescribed burn treatments in the Southwest. Study areas were located in ponderosa pine forests in six treatment units located on the Apache-Sitgreaves, Coconino, Kaibab, and Gila NFs. Although few of the results were statistically significant at  $p \leq 0.05$ , results included the following:

- Nearly half of large downed wood ( $\geq 9$  inch large end diameter) was consumed by prescribed fire. The authors surmised that drought conditions, followed by low wood moistures prior to fire treatments, may have contributed to the large loss of downed wood.
- Overall tree densities were also significantly reduced after fire treatments. However, the greatest reduction in tree densities was in the smallest size classes ( $< 3$  inches dbh and  $\geq 3$  to  $< 9$  inches dbh), with little change in larger ( $\geq 9$  inches dbh) tree densities. Small diameter trees tend to function as ladder fuels in dense stands and can carry flames into the crowns of mature trees; therefore, the removal of these smaller trees is likely to reduce the likelihood of stand-replacing fire, which is one goal of the proposed action. Large tree ( $\geq 9$  inches dbh) densities changed relatively little.
- Smaller snag ( $< 9$  inches dbh) densities increased 30 to 60 percent. With time, these dead trees could contribute to increased risk of spot fires.

In summary, thinning and prescribed burning is expected to reduce the risk of wildfire by reducing accumulations of fuels, but it will also modify and/or result in the loss of the key habitat components that comprise Mexican spotted owl habitat, both in PAC and recovery habitat. Design features/conservation measures will be implemented in an attempt to minimize these losses, but it is difficult to reduce and protect fuels on the same piece of ground. We do think that fire staff involved in implementing FWPP have gained experience over the years and will use best management practices to ensure that low severity fire effects are achieved. In addition, burning also increases vegetative diversity, which may result in a more diverse and productive prey base. However, based upon the number of acres proposed for burning in areas with fairly high levels of coarse woody debris, we think that there is a likelihood that key habitat components will be unintentionally lost to fire and that this could result in short-term adverse effects to Mexican spotted owls.

### Transportation and Roads

Maintaining, using, and constructing a transportation system to move people, equipment, and forest products on and off the Coconino NF in order to implement FWPP will result in effects to owls. Effects from road maintenance and construction, high volumes of traffic, and decommissioning can result in minor impacts to habitat (widening, tree removal, fill and grading), noise disturbance to owls in the presence of large amounts of traffic, and possible death from collisions of owls and vehicles. Some temporary road construction and maintenance may occur during the Mexican spotted owl breeding season within PACs. However, no roads, including temporary roads, will be built in nest cores or in recovery nest/roost replacement habitat.

Our assessment of potential disturbance to Mexican spotted owls and their habitat from road-related activities goes beyond the level of occupied habitat or total owl habitat. The risk of collisions extends well-beyond where owls nest and roost, and also includes all areas where they could be foraging, seasonally migrating, or dispersing through. Most logging traffic associated with FWPP would occur during day time hours when owls are not as mobile; however there could be occasions when trucks are operating at times when owls may be foraging in the area during the late afternoon or early morning. As a general rule, logging trucks usually begin their trip out to the harvest site pre-dawn and run until dark, particularly during summer months. In the winter, we would also expect that trucks would run when temperatures are coldest and road surfaces are frozen, which is typically in the pre-dawn and dusk hours. Mexican spotted owls are vulnerable to collisions with trucks because they are active in the late afternoon (two hours or so pre-sunset) to early morning (two hours or so post-sunrise) when they are actively foraging and defending their territories. Overall, we do not have information regarding how frequently owl-vehicle collisions might occur. However, there is potential risk from implementation of this project due to the level of truck traffic that will occur in Mexican spotted owl habitat.

Main haul routes have been identified and include Forest Roads (FR) 420, 556, and 557 for DLH and FR 132, 132A and 648 for MM. FR 420, 132, 132A and 648 pass within 0.25-mile of Mexican spotted owl nest/roost locations, increasing the potential for vehicle-related disturbance to nesting owls and collisions. Hauling within the DLH may occur within 0.25 mile of the Schultz Creek nest or roost locations during the breeding season. Schultz Creek road could be used to haul approximately 5,200 truckloads within 0.25 mile of the known roost location. Hauling of logs from MM may occur within 0.25 mile of Weimer Spring, DeToros, Archies, Mormon Mountain, and Moore-Well Rock Dike nest/roost locations during the breeding season. For Schultz, Archies, Mormon Mountain and Moore Well-Rock Dike PACs, the haul routes skirt the 0.25 mile buffer of known nests and roosts. But for Weimer Springs and DeToros PACs, the 132A haul route cuts through the buffers, increasing the potential for disturbance. There would be an estimated 4,700 truckloads that could haul on these routes. This disturbance would occur consistently (greater than twice per hour) for an extended period of time (greater than an hour) and could influence reproductive success if owls are nesting.

The proposed action would mechanically treat 4,727 acres in the DLH and 2,393 acres on MM, which roughly correlates to a maximum of 9,000 and 4,700 truckloads respectively of logs that would potentially be hauled adjacent to these PACs. Based on a normal operating season of April 15 to November 30 (150-210 days) and assuming mechanical treatments accomplish eight acres per day, helicopter logging 10 acres per day, and skyline and excaline yarding accomplish two acres per day, it could potentially take from 3.8 to 5.3 years (breeding seasons) to complete implementation in the DLH and 1.5 to 2.1 years (breeding seasons) to complete implementation on MM.

While no temporary roads would be constructed within any owl nest cores, there would be approximately 4.8 miles of temporary roads constructed within PAC habitat and another 1.0 miles of road reconstruction. No temporary roads would be constructed in recovery nest/roost replacement habitat, but there would be approximately 6.1 miles of temporary road construction within recovery habitat and another 0.9 miles of road reconstruction in order to accomplish thinning treatments. All temporary roads would be rehabilitated after harvesting has been completed.

### Disturbance

Implementation of FWPP is expected to result in disturbance effects during the breeding season. Conservation measures would minimize this disturbance by eliminating activities in nest cores during the breeding season where owls are documented to nest and roost. The intention of allowing activities during the breeding season within PACs would be to reduce the number of years (breeding seasons) Mexican spotted owls would be affected by project disturbances while allowing completion of the project to take place as quickly as possible. Activities that could result in disturbance to nesting, roosting, and foraging Mexican spotted owls could be caused by thinning and burning, helicopter flights, road construction and maintenance, hauling harvested forest materials, and road rehabilitation.

There are a growing number of studies attempting to describe and quantify the impacts of non-lethal disturbance on the behavior and reproduction of wildlife, and Mexican spotted owls in particular. Delaney et al. (1997) reviewed literature on the response of owls and other birds to noise and concluded the following: 1) raptors are more susceptible to disturbance-caused nest abandonment early in the nesting season; 2) birds generally flush in response to disturbance when distances to the source are less than approximately 200 ft and when sound levels are in excess of 95 dBA; and 3) the tendency to flush from a nest declines with experience or habituation to the noise, although the startle response cannot be completely eliminated by habituation. Delaney et al. (1999) found that ground-based disturbances elicited a greater flush response than aerial disturbances. Delaney and Grubb (2004) determined that spotted owls are capable of hearing sounds from road maintenance equipment to a distance of at least 0.25 mile. Our guidance is to limit potentially disturbing activities to areas  $\geq 0.25$  mile from Mexican spotted owl nest sites during the breeding season (March 1 - August 31). This corresponds well with the Delaney et al.'s (1999) 0.25 mile threshold for alert responses to helicopter flights. In addition, Delaney et al. (1999) found that Mexican spotted owls did not flee from helicopters when caring for young at the nest, but fled readily during the post-fledgling period. This may be a result of optimal fleeing decisions that balance the cost-benefit of fleeing. Frid and Dill (2002) hypothesize that this may be explained using predator risk-disturbance theory and perhaps the cost of an adult spotted owl fleeing during the nestling period may be higher than during the post-fledgling period.

There is a potential for owls to relocate because of noise disturbance during treatment activities. No mechanical treatments would occur within the Schultz Creek nest core during the breeding season (unless non-nesting is determined), but treatments will occur in the remaining PAC acres during the breeding season. Treatments within individual PACs would be limited to no more than two breeding seasons, which is expected to reduce the duration of potential disturbance to breeding owls.

The use of helicopter logging would require landings where trees are processed at the landing area. As stated above, Delaney (1999) indicates that a 344 ft buffer zone for helicopter overflights would minimize impacts of these overflights on Mexican spotted owls. Since no helicopters would be used to harvest trees in the MM project area, there would be no potential for noise disturbance from helicopters to owls in MM. However, all four PACs in the DLH area (Schultz Creek, Mount Elden, Orion Spring, and Weatherford 2) and within helicopter flight paths could be impacted. Estimated production rate for helicopter logging is about 10 acres per

day. Implementation of all proposed helicopter logging treatments within PAC and recovery habitats in the DLH would likely exceed 56 days in duration. However, a conservation measure to limit thinning and logging in each PAC to no more than two breeding seasons would limit the duration any one PAC would be impacted by helicopters. An implementation plan would be designed to ensure helicopter operations (i.e., helicopter landing locations, flight patterns) would minimize impacts to owls, especially during the breeding season.

Smoke from broadcast and pile-burning could also temporarily disturb Mexican spotted owls. Pile burning occurs during the winter and is not expected to result in disturbance to nesting owls. Broadcast (prescribed) burning would be managed to minimize the accumulation of smoke in PACs during the breeding season (see Conservation Measures). Short-term impacts from smoke would be reduced by coordination and timing and type of burning with wind direction, topography, time of year, and distance to PACs. Initial entry burning would not occur in nest cores during the breeding season, and burning would be restricted during the breeding season in areas that may create smoke impacts to occupied PACs. Prevailing southwest winds and the topography of the area typically act to lift smoke, carrying it away from ignitions sites. PACs on DLH and MM are on raised topographic features (mountains) and are not expected to have smoke settle in them long enough to cause discernable effects to owls because of air movement in these landscape-scaled features.

### Summary

The FWPP has done an excellent job of including measures to protect the Mexican spotted owl and its habitat by deferring management activities in core areas during the breeding season, planning for low severity fire effects in PACs, and attempting to minimize breeding season disturbance to Mexican spotted owls from proposed activities.

Even with these efforts, however, the FWPP has the potential to negatively affect the owl and its habitat when implemented. There is likely to be short-term disturbance to breeding owls as thinning activities would occur during the breeding season (even with the substantial efforts included to minimize these effects), some loss of key habitat components (large trees, snags, and logs), and some degree of potential for direct fatality from vehicular collisions due to the significant increase in logging truck traffic. Implementation of the project should result in benefits to the owl through habitat enhancement and fire risk reduction. The jointly developed monitoring plan will assist in tracking the effects of the action to owls and their habitat. Because there currently is uncertainty regarding treatment effects and risks to owl habitat with or without forest treatment until rigorous monitoring results from projects such as FWPP have been compiled and analyzed, we will continue to struggle with how to conduct thinning and burning activities in occupied and suitable owl habitat. Therefore, the FWPP gives us a unique opportunity to learn about treatment effects to the Mexican spotted owl and its habitat, as recommended in the Recovery Plan (USFWS 2012a).

### ***Effects of the action on Mexican spotted owl critical habitat***

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the

value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all designated CHUs, and the PCEs of those units, to determine the overall ability of all designated critical habitat to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

Below, we describe the PCEs related to forest structure and maintenance of adequate prey species and the effects from implementation of FWPP. The PCEs for steep-walled rocky canyonlands are not analyzed in this BO because this habitat does not occur within the action area.

All critical habitat acres (6,929 acres) within the FWPP treatment area are proposed for either thinning and/or prescribed burning.

Primary Constituent Elements related to forest structure:

*PCE:* A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with dbh of 12 inches or more.

*Effect:* Actions implemented under the proposed project are expected to retain the range of tree species (i.e., conifers and hardwoods associated with Mexican spotted owl habitat) and would not reduce the range of tree sizes needed to create the diverse forest and multi-layered forest canopy preferred by owls. In addition, these actions are designed to grow larger trees by reducing competition among trees for nutrients, sunlight, and moisture. Some loss of trees of all types and dbh size classes would occur during mechanical thinning and prescribed fire activities. However, actions implemented under the FWPP are expected to maintain a range of tree species and sizes needed to maintain this PCE in PACs and recovery habitat across the treatment area because the Forest Service is implementing the Recovery Plan (USFWS 2012a) guidelines that strive to retain large trees, canopy cover appropriate for owl habitat, and a diverse range of tree species (such as Gambel oak in pine-oak forests). There will be a complete loss of trees (including snags and large trees) on 88 acres in recovery habitat due to cable corridors. This correlates to approximately 108 live trees  $\geq 24$  inches dbh; however, because these effects will be small in extent and intensity, the function and conservation role of this PCE would not be compromised by the proposed action. These treatments that will reduce key habitat components in the short-term are also designed to develop an uneven aged structure and to increase the number of large trees in critical habitat over time. This will result in long-term benefits to this PCE and owl habitat.

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

*Effect:* We expect that tree shade canopy would be reduced following thinning and burning treatments implemented. Canopy cover would be eliminated on 88 acres where cable corridors are needed in recovery habitat. However, we do not expect canopy cover in Mexican spotted

owl forested habitat to be reduced below 40 percent because the Forest Service would retain multi-layered canopies where they occur in protected and recovery habitat and patches of regeneration would be interspersed throughout the thinning treatment areas, which, over time would contribute to development of multi-layered canopy structure. We would expect that some reduction in existing canopy cover (5 to 10 percent) may actually aid in increasing understory herbaceous vegetation and forb production, which could benefit Mexican spotted owl prey species. Because recovery habitat would retain canopy closure of 40 percent or more with a goal of developing larger trees, the function and conservation role of this PCE would not be compromised by the proposed action.

*PCE:* Large, dead trees (snags) with a dbh of at least 12 inches.

*Effect:* There would be a loss of snags within areas logged by helicopter and cable logging. Additionally, large snags could be both created and lost following proposed prescribed burning (Horton and Mannan 1988, Randall-Parker and Miller 2002). Snags would be created as large and small trees are killed through prescribed burning. This may benefit Mexican spotted owls, particularly their prey species as most snags created through the prescribed fire are likely to be  $\leq 9$  inches dbh (Saab et al. 2006). Snags used by Mexican spotted owls for nesting are typically very old, large dbh, highly decayed snags with cavities. Snags with these characteristics tend to be limited in ponderosa pine and mixed conifer forests in northern Arizona (Ganey and Vojta 2004). In individual burning projects, the Forest Service would attempt to minimize loss of these large snags through conservation measures (such as lining or using lighting techniques to avoid snags). The Forest Service has also agreed to identify patches of snags up to 10 acres in size in advance of treatment unit layout in cable and helicopter logging areas. This would allow for the protection of patches of snags when snags must be removed to protect workers in other treatment areas. Conservation measures/design features will be implemented to protect the largest and oldest snags. Therefore, although we anticipate there would be a measurable loss of snags due to implementation of the FWPP, efforts to protect this rare resource would be made to minimize this loss, and the function and conservation role of this PCE would not be compromised by the proposed action.

*Primary Constituent Elements related to maintenance of adequate prey species:*

*PCE:* High volumes of fallen trees and other woody debris.

*Effect:* Fallen trees and woody debris would likely be reduced by the proposed burning treatments (broadcast, piling, and maintenance burning) as reduction of coarse woody debris is a component of the proposed action. Research and monitoring indicates that prescribed burning could reduce logs by as much as 30 to 50 percent (Randall-Parker and Miller 2002, Saab et al. 2006). The loss of larger logs could result in short-term adverse effects to this primary constituent element and could result in localized impacts to prey species habitat. Loss of large logs will be minimized through site preparation, implementation planning, and ignition techniques. However, across the treatment area, it is likely that prescribed burning would also create fallen trees and woody debris as trees are killed post-burn and fall and in areas where large snags are cut for safety purposes. In addition, current data for many of these areas indicates that there is an excess supply of coarse woody debris due to the exclusion of frequent, low-severity fire, which can increase the likelihood of high-severity fire within recovery habitat. Therefore,

some removal of woody debris would result in an overall benefit to the function and conservation role of this PCE, though short-term adverse effects would likely occur within some areas.

*PCE:* A wide range of tree and plant species, including hardwoods.

*Effect:* We expect this PCE would be positively affected by the actions taken under the FWPP. Plant species richness would increase following thinning and/or burning treatments that result in small, localized canopy gaps. The FWPP includes conservation measures that focus on retaining Gambel oaks and other hardwood and coniferous species but some level of short-term loss could occur during logging operations, prescribed fires, or road construction/maintenance. However, current levels of Gambel oak are estimated to be above historical levels, and the function and conservation role of this PCE would not be compromised by the proposed action.

In addition, although aspen is not a cover type known to be used by Mexican spotted owls, it occurs in inclusions within PAC and recovery habitat. Twenty-two acres of aspen treatment are proposed within critical habitat. These treatments will enhance Mexican spotted owl prey species habitat, albeit in a relatively small area, within the CHU.

*PCE:* Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

*Effect:* Short-term decreases in plant cover would result from prescribed burning. We expect long-term increases in residual plant cover because fire treatments would provide conditions suitable for increased herbaceous plant growth by removing a thick layer of dead plant debris within treated areas. The mosaic effect created by burned and unburned areas and by opening up small patches of forest within protected habitat is also expected to increase herbaceous plant species diversity (Jameson 1967, Moore et al. 1999, Springer et al. 2001) and, in turn, assist in the production and maintenance of the Mexican spotted owl prey base. The combination of low-intensity prescribed burns and thinning during restoration projects would most likely result in only short-term effects to the Mexican spotted owls with regard to modifying prey habitat within treatment areas. In frequent-fire landscapes, herbaceous understory response and plant regeneration tends to be positive following tree removal and prescribed fire (Springer et al. 2001). There is the potential for wild and domestic ungulates to have adverse effects on the production of plant cover post-burning if ungulates were allowed to graze burned areas too soon following fire. However, the Coconino LRMP includes desired conditions and guidelines to maintain healthy levels of forage and for managing livestock following prescribed fire. Therefore, the function and conservation role of this PCE across the FWPP area would not be compromised by the proposed action.

#### *Effects of the action on the role of critical habitat in recovery*

Adverse effects and associated incidental take from the FWPP are not expected to negatively affect Mexican spotted owl recovery or further diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl. The FWPP includes objectives and species protection measures in accordance with the Recovery Plan (USFWS 2012a). These actions were identified by the Recovery Team as being necessary to conserve and recover the Mexican spotted

owl, and the FWPP will implement these actions in designated critical habitat. Designated critical habitat includes all PACs and recovery habitat (unoccupied suitable spotted owl habitat) within the project area. These actions include the following:

- The Forest Service within the project area has and continues to designate 600 acres surrounding known Mexican spotted owl nesting and roosting sites. PACs are established around owl sites and are intended to protect and maintain occupied nest/roost habitat. Nesting and roosting habitat is rare across the range of the Mexican spotted owl, and by identifying these areas, which are also critical habitat, for increased protection, the Forest Service is aiding in recovery.
- The FWPP has identified and is managing mixed conifer and ponderosa pine-oak forests that have potential for becoming Mexican spotted owl recovery nest/roost replacement habitat, or are currently providing habitat for foraging, dispersal, or wintering habitats. Nesting and roosting habitat is a limiting factor for the owl throughout its range. By managing critical habitat for future nest/roost replacement habitat, the Forest Service is aiding in recovery.
- The FWPP's intent is to integrate the best available recovery habitat management objectives where possible into the proposed fuels reduction treatments with the overall goal to protect owl PACs from high-severity wildland fire and to conduct actions to improve forest sustainability (e.g., thinning and prescribed burning). This management will ensure that Mexican spotted owl habitat continues to exist on the forest and that critical habitat will continue to retain its function for conservation and recovery of the owl. In addition, the FWPP includes a monitoring plan that will aid us in learning how to conduct thinning and burning activities in PACs.

Over the long-term, these actions should increase the sustainability and resiliency of Mexican spotted owl habitat (particularly through fuels management and forest restoration actions). Therefore, implementation of the FWPP is not expected to further diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl.

## **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Climate change, in combination with drought cycles, is likely to exacerbate existing threats to all these species' habitats in the southwestern U.S., now and into the foreseeable future. Increased and prolonged drought associated with changing climatic patterns will adversely affect streams and riparian habitat by reducing water availability and altering food availability and predation rates. The continued warming and drying of forested habitats will likely alter vegetation structure and composition and reduce the amount and quality of nesting and roosting habitat for Mexican spotted owls in the action area. However, implementation of forest restoration and

fuels reduction projects such as FWPP should help to mitigate some of the long-term effects of climate change on Mexican spotted owl habitat.

The main non-Federal activities that may impact the Mexican spotted owl habitat are loss of habitat through development of private inholdings for home sites and related disturbance at these properties. Within these private lands, there is the potential for activities that create disturbance or removal of Mexican spotted owl habitat components on private lands, such as roads, grazing, mining, recreation activities, and fuel treatments. Mexican spotted owl critical habitat has not been designated on non-Federal lands; there are no anticipated cumulative effects to Mexican spotted owl critical habitat from non-Federal actions. The Navajo Nation owns a 140-acre parcel in the middle of the DHL project area. The parcel borders the Mount Elden PAC. The tribe has partnered with the City of Flagstaff to complete vegetation treatments on about 105 acres within this parcel. Thirty-five acres of hand thinning was completed in the fall of 2014 with piles planned to be burned in 2016. The remaining 70 acres is planned for mechanical treatments in coordination with actions on Forest Service managed-lands. There are no plans for development of the parcel.

## CONCLUSION

This biological opinion does not rely on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.<sup>1</sup>

### **Mexican spotted owl and critical habitat**

After reviewing the current status of the Mexican spotted owl and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the FWPP will not jeopardize the continued existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:

1. The FWPP will strive to implement the Recovery Plan (USFWS 2012a) and manage for Mexican spotted owl recovery on the Coconino NF.
2. Desired conditions and guidelines in the FWPP recognize the need to reduce the potential for landscape level, stand-replacing fire in ponderosa pine- oak and mixed conifer forests that the Mexican spotted owl occupies. These efforts to improve forest condition and sustainability should reduce the risk of high severity fire and subsequently, reduce the loss of owl habitat, particularly nest/roost habitat.
3. Based on the discussion provided in the Effects to Mexican Spotted Owl Critical Habitat section above, CHU UGM 14, which will be affected by treatments conducted under

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<sup>1</sup> See December 27, 2004, memo from Acting Director Fish and Wildlife Service. This analysis is also consistent with our proposed definition of “destruction or adverse modification of critical habitat” published in the *Federal Register* on May 12, 2014 (79 FR 27060).

FWPP, will continue to serve the function and conservation role of critical habitat for the Mexican spotted owl.

The conclusions of this BO are based on full implementation of the project as summarized in the "Description of the Proposed Action" section of this document, including the standards and guidelines that apply to the action and serve as conservation measures that were incorporated into the project design.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

### **Mexican spotted owl**

For the purpose of evaluating incidental take of Mexican spotted owls from the action under consultation, incidental take can be anticipated as either the direct fatality of individual birds or the alteration of habitat that affects behavior (e.g., breeding or foraging) of birds only temporarily, or to such a degree that the birds are considered lost as viable members of the population and thus "taken." Birds experiencing only temporary or short-term effects may fail to breed, fail to successfully rear young, or raise less fit young; longer-term disturbance may result in owls deserting the area because of chronic disturbance or because habitat no longer meets the owl's needs.

We anticipate that the proposed action is reasonably certain to result in incidental take of Mexican spotted owls. However, it is difficult to quantify the number of individual owls potentially taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is secretive and we rarely have information regarding the number of owls occupying a PAC and/or their reproductive status. For these reasons, we will attribute incidental take at the PAC level. This fits well with our current section 7 consultation policy, which provides for incidental take if an activity compromises the integrity of an occupied PAC to an extent that we are reasonably certain that incidental take occurred (USFWS 1996). Actions outside PACs will generally not result in incidental take because we are not reasonably certain that Mexican spotted

owls are nesting and roosting in areas outside of PACs. We may modify this determination in cases when areas that may support spotted owls have not been adequately surveyed and we are reasonably certain spotted owls are present.

### **Amount of Take**

Based upon analyses of the effects of Forest Service projects within previous forest restoration BOs, we anticipate the majority of incidental take for actions implemented under the FWPP proposed action will be in the form of short-term harassment. Owls experiencing short-term harassment may fail to successfully rear young in one or more breeding seasons, but will not likely desert the area because of a short-term disturbance (Delaney et al. 1999); harassment is measured as owls taken associated with a specific number of PACs. Incidental take in the form of harm is also anticipated, albeit at a lesser amount than take from harassment and is measured as the number of owls taken. For this project harm would be the direct fatality of individual birds.

There are at least 10 PACs that could be affected by FWPP. All PACs have acreage that will be thinned and prescribe burned.

Using available information as summarized within this document, we have identified conditions of incidental take for the Mexican spotted owl associated with implementation of the FWPP. Based upon the potential for incidental take to occur as part of implementation of the project, we anticipate the following incidental take for the proposed action, which is in addition to previously authorized incidental take resulting from ongoing projects or projects that have yet to be implemented:

- We anticipate the take of one pair of Mexican spotted owls and/or associated eggs/juveniles in the form of harassment in up to six PACs per year due to a single (one breeding season) or short-term (one to three breeding seasons) disturbance (non-habitat altering action that disrupts or is likely to disrupt owl behavior within the PACs) or habitat alteration (e.g., short-term loss of key habitat components) associated with implementation of the proposed action. We do not expect that each year owls associated with six PACs may be taken as a result of short-term disturbance and/or habitat alteration; however, we think the potential is there in any given year. The disturbance and short-term habitat modification generated by activities associated with FWPP is likely to interrupt, impede, or disrupt normal behavior patterns to the point that breeding and feeding activities are impacted over the course of one to three breeding seasons. Incidental take is exceeded if owls associated within an individual PAC are harassed over the course of more than three breeding seasons or if owls associated with more than six PACs are harassed in one year as a result of this project. Under the 2012 LRMP BO we anticipated harassment of Mexican spotted owls associated with up to nine PACs per year (5 percent) of the 186 PACs on the NF due to a single or short-term disturbance. The only other incidental take we have anticipated under the LRMP BO is for the 4FRI Project (up to four PACs per year due to a single or short-term disturbance). Although cumulatively this allows for incidental take of up to 10 PACs per year, based upon the project implementation schedules, incidental take will not exceed nine PACs per year while the 2012 LRMP BO is in effect.

- In addition, we anticipate the incidental take of two Mexican spotted owls in the form of harm and/or direct fatality due to vehicular collision on average once every five years, for a ten-year period. Following the discovery of two fatalities, we will re-assess the project with the Forest Service and determine how to reduce fatalities. This incidental take is within the number of owls anticipated to be incidentally taken (harmed) under the 2012 BO for the Coconino NF LRMP.

## **EFFECT OF THE TAKE**

In this BO, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the Mexican spotted owl. We have based this determination on the number of PACs with anticipated take from mechanical thinning and burning projects to be implemented under FWPP that could have short-term adverse effects, but long-term benefits to the Mexican spotted owl, and direct fatality that could occur from vehicular collisions.

No reasonable and prudent measures are included in this incidental take statement as the Forest Service has worked with us to incorporate the measures needed to minimize incidental take into the proposed action, including monitoring and reporting.

## **Disposition of Dead or Injured Listed Species**

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, NM 87113; 505-248-7889) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve the biological material in the best possible state.

Certain project activities may also affect species protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (Eagle Act). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the FWS. The Eagle Act prohibits anyone, without a FWS permit, from taking (including disturbing) eagles, and including their parts, nests, or eggs. If you think migratory birds will be affected by this project, we recommend seeking our Technical Assistance to identify available conservation measures that you may be able to incorporate into your project. Please see Appendix C for our technical assistance to avoid take of bald or golden eagles.

For more information regarding the MBTA and Eagle Act, please visit the following websites. More information on the MBTA and available permits can be retrieved from <http://www.fws.gov/migratorybirds> and <http://www.fws.gov/migratorybirds/mbpermits.html>. For information on protections for bald eagles, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR

31132) published in the Federal Register on June 5, 2007 (<http://www.fws.gov/southwest/es/arizona/BaldEagle.htm>), as well at the Conservation Assessment and Strategy for the Bald Eagle in Arizona (SWBEMC.org).

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Forest Service work with us to conduct Mexican spotted owl surveys over the next several years to attempt to determine how owls modify their territories in response to wildland fires on the Coconino NFs. This information will aid us in understanding the short- and long-term impacts of fire on the owl and its subsequent effect on the status of the species in the UGM EMU. Surveys should be coordinated with the FWS prior to implementation of any project.
2. We recommend that the Forest Service continue to work with us to design forest restoration treatments across the Coconino NF that protect existing nest/roost habitat from high-severity, stand-replacing fire, and enhance existing or potential habitat to aid in sustaining Mexican spotted owl habitat across the landscape. PACs can be afforded substantial protection from wildland fire by emphasizing fuels reduction and forest restoration in surrounding areas outside of PACs and nest/roost habitat.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

## REINITIATION NOTICE

This concludes formal consultation on the action outlined in your request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required when discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

In keeping with our trust responsibilities to American Indian Tribes, we encourage you to continue to coordinate with the Bureau of Indian Affairs in the implementation of this consultation and, by copy of this biological opinion, are notifying affected Tribes of its completion. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate the Forest Service's efforts to identify and minimize effects to listed species from this project. For further information please contact Shaula Hedwall (928-556-2118) or Brenda Smith (928-556-2157). Please refer to the consultation number, 02EAAZ00-2013-F-0190, in future correspondence concerning this project.

Sincerely,



 Steven L. Spangle  
Field Supervisor

cc (electronic):

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District Ranger, Mogollon Rim Ranger District, Coconino National Forest, Blue Ridge, AZ  
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APPENDIX A – FIGURES

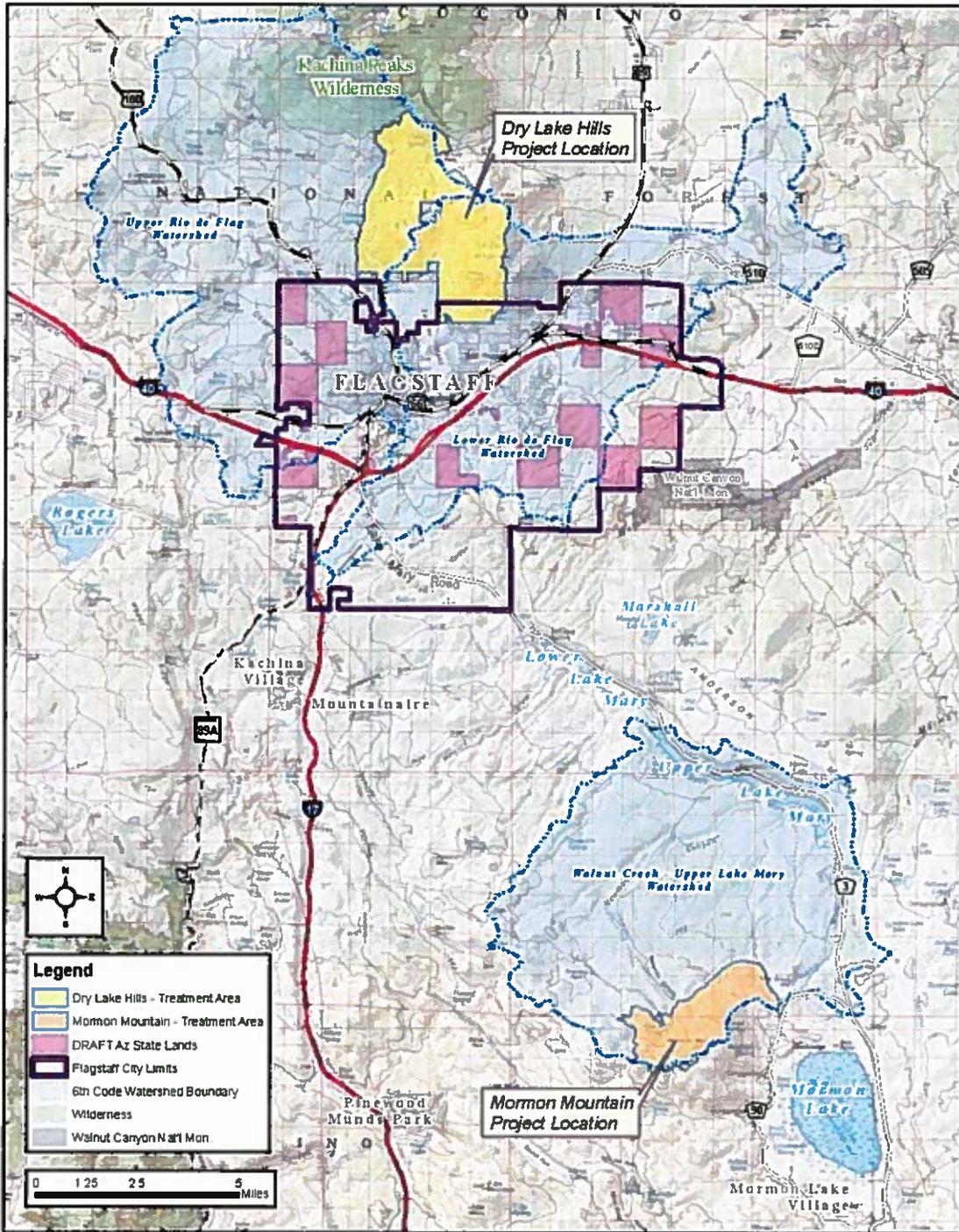


Figure 1. Vicinity map of the Flagstaff Watershed Protection Project.

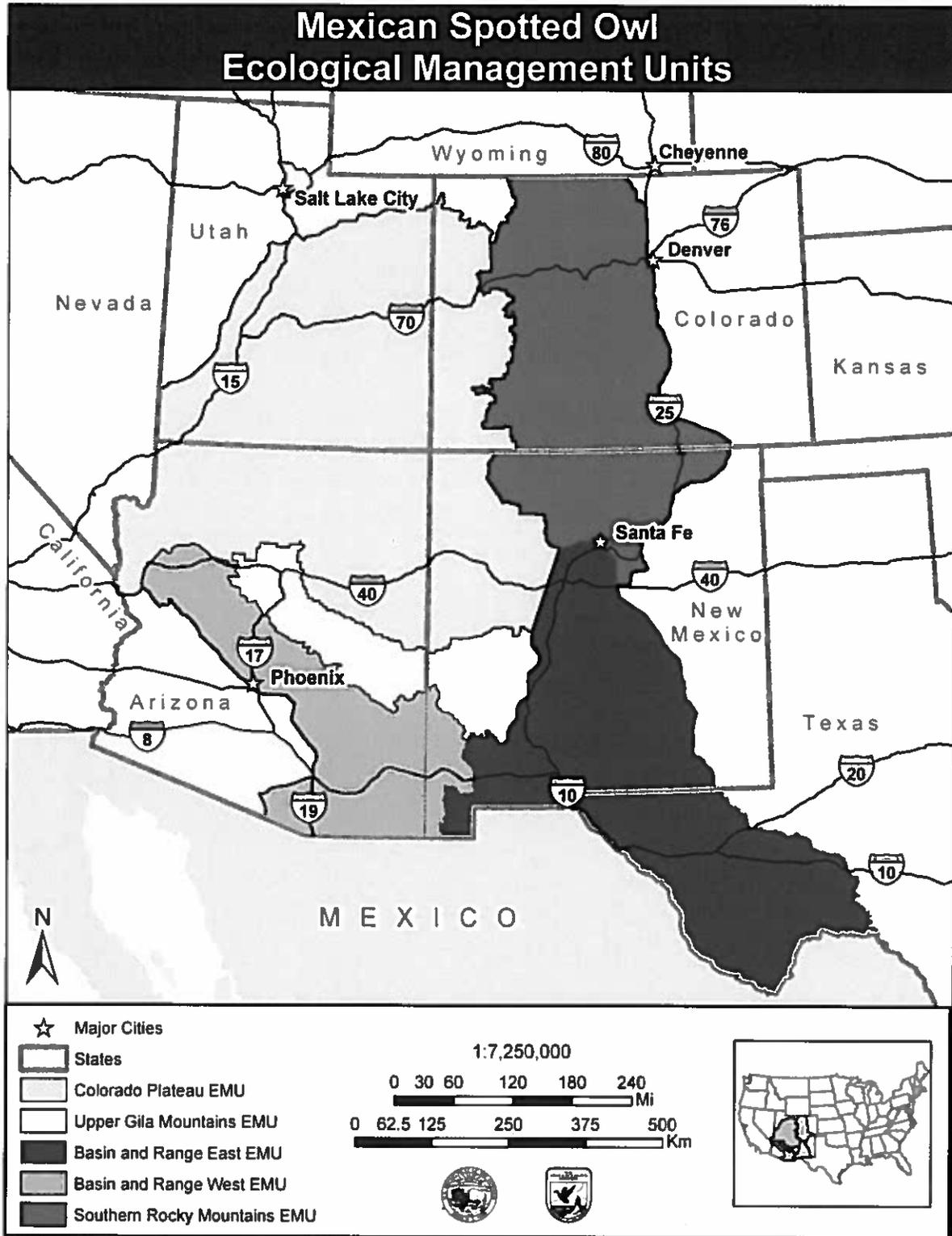


Figure 2. Ecological Management Units for the Mexican spotted owl in the southwestern United States.

## APPENDIX B - MEXICAN SPOTTED OWL MONITORING

As part of the Flagstaff Watershed Protection Project (FWPP), fuels reduction and prescribed burning activities will occur within Mexican spotted owl protected activity centers (PACs). Protected activity centers are occupied habitat. The effects of these treatments to owls and nesting/roosting habitat are not fully known. The Mexican spotted owl Recovery Team thinks that PACs can be afforded substantial protection by emphasizing fuels reduction and forest restoration in surrounding areas outside of PACs and nest/roost habitat; however it is recognized that in some cases protection of nest/roost habitat and human communities requires these actions to occur within PACs. The Mexican spotted owl Recovery Plan, First Revision (USFWS 2012a) provides guidance for these treatments and emphasizes the need for monitoring and feedback loops to allow management to be adaptive. Well-designed monitoring will provide valuable information on the effects of these activities on the owls and their habitat. Therefore, the Forest Service has been working with the U.S. Fish and Wildlife Service (FWS) to propose a monitoring plan that should help us begin to understand the effects of thinning and burning on Mexican spotted owls and their habitat.

The proposed monitoring plan would pair treated and untreated (reference) PACs within the Dry Lake Hills (n=3) and Mormon Mountain (n=3) portions of the project and compare occupancy rates, reproduction rates, and habitat changes.

### *Guiding Question:*

- Do planned treatments (e.g., thinning, prescribed fire) affect occupancy and reproductive rates in treated versus untreated (reference) PACs?

### *Identified Response Variables:*

- Owl occupancy rate (corrected for detection probability; the percent of PACs occupied before and after treatments).
- Owl reproductive output (the number of fledglings observed per adequately checked pair before and after treatments).
- Habitat change (the immediate effect of a treatment type on key variables selected from Table C.1 [USDI 2012, pp 276-277] showing description of desired conditions [DCs]) in forest and woodland cover types typically used by Mexican spotted owls for nesting and roosting. Analysis would incorporate what is retained as well as extent of change.

### *Planned Treatments:*

- Treatments will likely be variable in spatial extent and intensity (intensity measured by degree of change in key habitat variables related to DCs [see Table C.1, USFWS 2012a]).

*General Study Design Approach:*

- For each treatment area (DLH and MM), monitoring will contrast a set of reference PACs (with no planned treatments) to a set of treatment PACs. Reference PACs match the environmental conditions in PACs where treatments are proposed, as closely as possible. Below is a list of the currently identified reference PACs; however, these are subject to change if owls cannot be located in the identified reference PACs.
  - For the DLH project area, treatments are proposed for the entire PAC in three PACs: Mt. Elden (040202), Schultz Creek (040206), and Orion Spring (040207). Additionally, treatments are proposed in a portion (163 acres) of the Weatherford 2 PAC. Three reference PACs are: Snowbowl (040205), Little Spring (040227), and East Bear Jaw (040233).
  - For the Mormon Lake project area, treatments are proposed for the entire PAC in three PACs: Mormon Mountain North (040508), Weimer Springs (040532), and DeToros (040533). Additionally, portions of Mormon Mountain (040551), Lockwood (040541), Moore Well-Rock Dike (040511) overlap with the project area (149, 148, and 20 acres respectively). Treatment PACs will be those with the entire PAC treated. Since the proposed areas for treatment are predominately mixed conifer, controls need to be similar. Potential reference PACs are Red Raspberry (040503), Dairy Springs (040507), Moore Well-Rock Dike (040511) which overlap with the project area. However, treatments would need to occur later in time.
  - Final determination of MM reference PACs will occur prior to installation of sampling plots and based on current monitoring data. Changes would be developed with FWS and modified as appropriate.
- Establish and install long-term forest monitoring plots in treated PACs in the FWPP area and untreated PACs outside of FWPP.
  - There are four treatment types proposed in PACs: Burn Only, PAC Fuels Reduction Mixed Conifer, PAC Fuels Reduction Hand Thinning and Nest Fuels Reduction. Sampling will be stratified by treatment type with long-term fixed plots randomly located within treatment types.
  - Long-term fixed plots will be randomly located in reference PACs where treatments are not proposed.
- Measure habitat change to calibrate treatments effects using the following desired condition variables (Table C.1):
  - Methods Outline (all sites):
    1. Establish and install long-term forest monitoring plots in treated PACs in the FWPP area and untreated PACs outside of FWPP:
      - a. Sampling stratified by treatment type (~ 1 plot per 22 ac [9 ha]).

- b. Long-term, fixed plots randomly located within treatment types within PACs.
  - c. Nested circular plot sampling; trees and shrubs:
    - i. Standing dead trees (snags) = 0.20-ac (8712 ft<sup>2</sup>) (0.08 ha).
    - ii. Live trees  $\geq$  4.5 ft height = 0.10-ac (4356 ft<sup>2</sup>) (0.04 ha).
    - iii. Shrubs and trees < 4.5 ft height = 0.025=ac (1076 ft<sup>2</sup>) (0.01 ha).
  - d. Fuels/coarse wood transects (x 2):
    - i. 50 ft length:
      - 1. Moisture-lag classes (<0.25 in; .25-1.0 in; 1.0-3.0 in. +3 in. (sound/rotten).
      - 2. Diameter/length/location all +3 in. CWD.
  - e. Canopy cover:
    - i. 50-ft line intercept (x 2).
- Sample response variables for owls each year, using a design that allows estimation of effects to occupancy, detection probability, and reproductive output.
    - Monitor treatment and reference PACs using the Mexican Spotted Owl Survey Protocol U.S. Fish and Wildlife Service, 2012.
  - Sample timing:
    - PAC monitoring will be completed one year pre-treatment, during treatment year, and one, three, and five years post-treatment.
    - Vegetation sampling will be completed prior to treatments (as close as possible prior to implementation), one and five years post-treatment.

*Analytic Approach:*

- Simple treatment effect stratified by treatment type and geographic area/cover type.

*Quality Control / Assurance:*

- Vegetation monitoring has already begun in the DLH portion of the project, and information/lessons learned will be used to inform the monitoring for MM. Any changes will be developed with FWS and modified as appropriate.

## APPENDIX C – TECHNICAL ASSISTANCE

This appendix contains recommendations to the Forest Service to reduce the likelihood of take of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) from implementation of the FWPP.

The final rule to remove the bald eagle from the Federal List of Threatened and Endangered Species was published in the Federal Register on July 9, 2007, and took effect on August 8, 2007. However, bald and golden eagles continue to be protected by the Bald and Golden Eagle Protection Act (Eagle Act). The Eagle Act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking eagles, including their parts, nests, or eggs. "Take" is defined under the Eagle Act as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" eagles. Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based upon the best scientific information available: (1) injury to an eagle; (2) a decrease in an eagle's productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or, (3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (USDI 2007).

FWS and the Forest Service jointly developed the following conservation measures to minimize impacts to bald and golden eagles in the project area. These measures are consistent with the strategies identified in the Conservation Assessment and Strategy for the Bald Eagle in Arizona (Driscoll et al 2006). We agree that implementation of the following measures will reduce the likelihood of take.

### Bald eagles

- No cable or helicopter logging would occur in the MM project area where bald eagle potential habitat is known to occur, therefore, there would be no potential for noise disturbance.
- Prescribed burning will be coordinated spatially and temporally to limit smoke impacts to bald eagle breeding areas during the breeding season (if occupied). Prescribed burning in the MM project area of FWPP would only occur if ventilation is favorable and would be coordinated with the District Biologist and FWS.
- No aircraft used for logging would operate within 1,000 ft. of a nest during breeding season.
- Treatments would utilize ground-based harvesting across the majority of the project area. This would reduce the number of large trees and snags cut within potential bald eagle nesting/roosting habitat in the MM area. Since no helicopters would be used to harvest trees in the MM area, there would be no potential for noise disturbance from helicopters to bald eagles.

### Golden eagles

- Known nest trees and nest sites, if occupied, will be protected from disturbance.
- There would be no direct effects to nesting golden eagles as the nearest nesting golden eagle is over one-half mile from the project, and noise generated from these activities is not expected to be audible at the nearest nest site. The nearest nest location occurs on a

cliff face on a raised topographic feature, and it is not expected that smoke would settle around the nest long enough to cause discernible effects to golden eagles because of the air movement away from this landscape scale feature.

- Spring or summer burning in the MM project area would be coordinated with the District Biologist and FWS personnel if either of the two golden eagle nests becomes occupied. Typically nesting can be confirmed by May and nests would be monitored prior to prescribe burning.
- Helicopter paths would be reviewed to exclude flights over occupied nest locations during the golden eagle breeding season

#### **LITERATURE CITED FOR APPENDIX C**

Driscoll, J.T., K.V. Jacobsen, G.L. Beatty, J.S. Canaca, and J.G. Koloszar. 2006. Conservation assessment and strategy for the bald eagle in Arizona. Nongame and Endangered Wildlife Program Technical Report 173. Arizona Game and Fish Department, Phoenix, Arizona.

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