



United States Department of the Interior

Fish and Wildlife Service Arizona Ecological Services Office

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In reply refer to:

AESO/SE

02EAAZ00-2015-F-0733

July 23, 2018

Ms. Laura Jo West, Forest Supervisor
Coconino National Forest
1824 South Thompson Street
Flagstaff, Arizona 86001-3600

RE: Cragin Watershed Protection Project Biological Opinion

Dear Ms. West:

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 was dated January 26, and received by us on January 29, 2018. At issue are impacts that may result from the proposed Cragin Watershed Protection Project (CWPP) located in Coconino County, Arizona. The proposed action may affect the threatened Mexican spotted owl (*Strix occidentalis lucida*) and its designated critical habitat.

In your letter, you requested our concurrence that the proposed action is not likely to adversely affect the Little Colorado spinedace (*Lepidomeda vittata*) and its critical habitat, and the threatened Chiricahua leopard frog (*Lithobates [Rana] chiricahuensis*). We concur with your determinations and include our rationales in Appendix A.

This biological opinion is based on information provided in the January 26, 2018, biological assessment (BA), the April 25, 2018, amendment to the BA, the May 20, 2018, Final Environmental Assessment and Draft Decision Notice (and associated specialist reports), telephone conversations, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, mechanical thinning and prescribed burning and their effects, or on other subjects considered in this opinion. A complete record of this consultation is on file at this office.

Consultation History

- November 18, 2014: We began exchanging electronic emails, participating in meetings, and discussing and developing this project with Forest Service staff.
- February 9, 2015: The Forest Service initiated the C.C. Cragin Fuels Reduction Project, which later become the Cragin Watershed Protection Project (CWPP).
- April 16, 2015: We participated in the first project Interdisciplinary Team meeting.
- February 24, 2016: The Forest Service requested comments on the CWPP proposed action.
- March 25, 2016: We provided comments on the CWPP proposed action.
- May 5, 2016: The Forest Service officially requested that we participate in the process as a cooperating agency.
- May 5, 2016: We participated in a CWPP field trip with the Forest Service and the Center for Biological Diversity.
- August 15, 2016: We accepted the Forest Service's request to be a cooperating agency.
- August 31, 2016: We participated in a meeting to discuss including processing sites as part of the CWPP proposed action.
- December 6, 2016: We participated in a CWPP Stakeholder Meeting.
- April 27, 2017: We participated in a meeting to discuss our early comments on the Preliminary CWPP EA, prior to public release.
- May 23, 2017: The Forest Service requested comments on the CWPP Preliminary EA.
- June 30, 2017: We provided comments on the CWPP Preliminary EA.
- August 28, 2017: We participated in the Cooperating Agency Workshop on Forest Restoration, Project Implementation, and Data. This meeting was initiated in regards to our comments on existing condition data.
- September 28, 2017: We participated in a meeting to discuss CWPP implementation planning.
- November 8, 2017: We participated in a CWPP stakeholder meeting and field tour.
- January 29, 2018: The Forest Service initiated formal consultation on the CWPP.
- February 27, 2018: We issued a thirty-day letter initiating formal consultation.
- April 25, 2018: The Forest Service amended the BA with new information. In the interest of continuing to move forward, we did not formally adjust the consultation timeline in response to significant changes to the BA.
- May 10, 2018: We participated in a meeting the Forest Service held to update stakeholders on planning and implementation.
- May 20, 2018: The Forest Service released the Final EA and draft Decision Notice to the public.
- July 3, 2018: We emailed the draft BO to the Forest Service.
- July 9, 2018: We received comments on the draft BO from the Forest Service.
- July 19, 2018: We met with the Forest Service to discuss questions regarding the Incidental Take Statement.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The complete description of the proposed action and effects analysis can be found in your January 2018 BA, April 2018 Amendment to the BA, May 2018 EA, and other supporting information in the administrative record. These documents are included herein by reference.

The proposed action is designed to reduce the risk for high-severity fire and potential post-fire erosion and/or flooding in the C.C. Cragin Reservoir watershed within a twenty-year period, or sooner if possible. Hazard fuel reduction and forest restoration activities proposed for the Cragin Watershed Protection Project area consist of mechanical vegetation treatments on approximately 37,764 acres and prescribed burning treatments on 63,634 acres within the project area. Multiple prescribed fire treatments would be conducted over the next two decades on all acres proposed for treatment to mimic natural fire return intervals. Treatments in Mexican spotted owl habitats are designed to meet guidelines in the Mexican spotted owl Recovery Plan, First Revision (USFWS 2012a; Recovery Plan), and prescriptions will be developed in conjunction with the FWS.

Hazardous fuel reduction actions would include the actions summarized in Tables 1 and 2. All the fuel reduction treatments (except the Baker Butte Treatment for which there is more detailed data) are based on the best available data used to determine forest cover and associated wildlife habitat; however, these acreages may change as better data become available during implementation. The Forest Service does not have complete information on the actual forest conditions or even vegetation type in all areas. For the treatments proposed, vegetation cover (e.g., ponderosa pine) and habitat management type (e.g., protected activity center [PAC]) are the primary characteristics used to determine the treatment under this analysis. Adjustments to the various treatments, acres treated and the treatment type tool used may change during implementation based on actual site conditions and new information. Adjustments to treatments proposed within Mexican spotted owl habitat will be performed in coordination with the U.S. Fish and Wildlife Service.

Table 1. Summary of proposed mechanical vegetation treatments.

Treatment	Acres
Ponderosa Pine Treatments outside of post-family fledging area (PFA)s	22,326
Ponderosa Pine Treatments within Northern Goshawk PFAs	434
Pre-commercial Thinning	109
Mexican spotted owl Recovery Habitat: Ponderosa Pine-Gambel Oak	6,172
Mexican spotted owl Recovery Habitat: Mixed Conifer	7,066
Mexican spotted owl Protected Activity Center (PAC) Treatments: Ponderosa Pine-Gambel Oak	1,084
Mexican spotted owl PAC Treatments: Mixed Conifer	270
Mexican spotted owl PAC Treatments: Pre-commercial Thinning	277
Baker Butte Treatment (not owl habitat)	27

Treatment	Acres
Total Mechanical Vegetation Treatments	37,764
Percent of Project Area	59%
No Mechanical Vegetation Treatments	25,869
No Treatment (Water)	242
Private Lands	557
Total Acres	64,433*

*Acreage adds up to one acre less than total as a result of rounding

Table 2. Summary of proposed prescribed fire treatments.

Prescribed Burning Treatment Type	Acres
Activity Fuels Treatment, Broadcast Burn, Maintenance Burn	37,766
Broadcast Burn, Maintenance Burn	25,868
Total Prescribed Fire Treatments	63,634
Percent of Project Area	99%
No Treatment (Water)	220
Private Lands	557
Total Acres	64,433

The CWPP proposes vegetation treatments utilizing prescribed cutting and prescribed fire to lessen the risk of high-severity, stand-replacing fire and infrastructure damage within the wildland urban interface and surrounding values at risk. Treatment prescriptions are designed to move forest vegetation towards the desired conditions (as defined in the May 2018 EA). The main silviculture tool used is uneven-aged selection cutting, which is described as the combination of group and single tree selection systems with reserve trees left in all structural stages, and is the Forest Service’s recommended treatment for creating clumpy and irregular stand structure. The Forest Service states that mixed conifer forests types will be treated to result in a more finely grouped pattern with many stand-alone trees.

- Mechanical treatments would include: the use of chainsaws or feller-bunchers to cut trees and lop slash, skidders to move material to landings along approved skid trails, and bulldozers to pile or rearrange slash for burning or erosion control. Other specialized equipment may be used to cut, chop, break, lop or treat the fuels to meet resource objectives; however, the use of helicopters, cable-logging systems, or other such equipment is not analyzed in this document.
- Landings created for treatments would range in size from 0.25 to 1 acre with an average of one landing every 20 acres.
- Within the treatment units identified for prescribed cutting, post-settlement ponderosa pines (in Vegetation Structural Stage [VSS] class 5 or 6) may be removed following the Project’s Large and Old Tree Implementation plans. VSS 5 trees are those with a diameter-at-breast height (dbh) of 18-23.9 inches and VSS 6 tree have a dbh of 24 inches and greater. However, the creation of openings and interspace and the majority of tree

cutting would be primarily focused in VSS 2 (dbh 1-4.9 inches), 3 (dbh 5-11.9 inches) and 4 (dbh 12-17.9 inches) tree size classes.

- Prescribed burning or tree thinning may be the initial treatment during implementation depending on the current conditions as compared to desired conditions. Where very dense forest conditions exist with an abundance of ladder fuels, thinning would need to occur prior to conducting prescribed burning treatments. Tree harvest methods may include traditional methods of felling trees by hand within the unit or using mechanical harvester equipment.
- The growth of additional large Gambel oaks would be promoted by thinning of ponderosa pine and prescribed burning. Gambel oak and other hardwood tree species may also be removed to create temporary roads and landings; however every attempt would be made to avoid cutting Gambel oak particularly those greater than 10 inches diameter at root collar (drc).

Treatment Prioritization

The Forest Service identified five areas totaling approximately 9,681 (26 percent of the acres proposed for mechanical treatments or hand thinning) as priority treatment areas that are key to reducing the risk of high-severity, stand-replacing fire in the project footprint. Treatment of these priority acres would protect key infrastructure, watershed areas, and habitat for federally listed species. These areas would be the main focus of mechanical treatments and hand thinning at the beginning of implementation. To facilitate the implementation of mechanical treatments and hand thinning, the proposed action would allow for treatments to occur without a Mexican spotted owl breeding season timing restriction on the approximately 3,134 acres that are within 0.25 mile of 12 different PACs in three of the five priority areas. Without this exception, mechanical treatment operators would likely be required to move in and out of any given priority area several times over several years to complete each treatment. This would result in extended treatment timelines, substantial increases of treatment costs and an increased risk of effects to values at risk in these areas from high-severity, stand-replacing fire.

Mexican spotted owl Mechanical Treatments

PAC Treatment, Ponderosa Pine–Gambel Oak

Within Mexican spotted owl PACs proposed for treatment, mechanical treatments would be designed to reduce surface and ladder fuels while enhancing and maintaining forest health and key habitat components for the spotted owl. Possible treatment tools include single tree and group selection tree regeneration methods, intermediate thinning, stand improvement thinning, and prescribed fire. The treatments would mimic natural disturbance patterns by incorporating irregular tree spacing and various opening sizes into the treatment design. Mechanical treatments would create a diversity of patch sizes with a minimum patch size of 2.5 acres. No trees greater than 18 inches dbh would be removed. The residual basal area post-treatment would range from 80 to 140 ft²/acre, with trees greater than 16 inches dbh contributing more than 50 percent of the stand basal area. A minimum of 40 percent canopy cover would be retained. Openings ranging from 0.1 to 2.5 acres in size would be implemented across 10 to 15 percent of

the treatment acres within the PAC. Treatments would retain woody debris larger than 12 inches in diameter at the large end, all snags, to the extent practicable, and hardwood trees. Mechanical treatments would be either preceded by or followed by an initial entry or maintenance prescribed burn, depending on the implementation schedule. No mechanical or hand thinning treatments would occur within any PAC nest core.

PAC Treatment, Mixed Conifer

Within dry mixed conifer Mexican spotted owl PAC habitat, treatments would be designed to reduce surface and ladder fuels while enhancing and maintaining forest health and key habitat components for the spotted owl. The treatment is similar to the pine-oak PAC treatment with a focus on retaining ponderosa pine, Douglas fir, and Southwestern white pine. No trees greater than 18 inches dbh would be removed. The residual basal area post-treatment would range from 90 to 140 ft²/acre, and trees greater than 16 inches dbh would contribute more than 50 percent of the stand basal area. A minimum canopy cover of 60 percent would be maintained throughout the treatment areas. Mechanical treatments would be either preceded by or followed by an initial entry or maintenance prescribed burn, depending on the implementation schedule. No mechanical or hand thinning treatments would occur within any PAC nest core or wet mixed conifer PAC habitat.

Pre-commercial Thin in PACs

The purpose of a pre-commercial thin (PCT) is to reduce ladder fuels, thereby reducing the potential effects of wildfire and provide for increased high severity fire risk reduction for nest cores within PACs. The proposed treatment consists of hand thinning conifers generally less than 9 inches dbh that act as ladder fuels underneath the canopy of larger trees. The trees would be thinned at varied spacing to provide species diversity and horizontal structure with the average spacing being 15 feet. This treatment would mimic natural disturbance patterns (to the extent possible) by incorporating natural variation, such as irregular tree spacing into the prescription. Biomass or other material may be sold or removed from the site as a byproduct of the PCT activity or piled and burned. Thinning treatments would be either preceded by or followed by an initial entry or maintenance prescribed burn, depending on the implementation schedule.

Recovery Habitat Treatment, Ponderosa Pine- Gambel Oak

Within Mexican spotted owl recovery pine-oak habitat, treatments would be designed to reduce surface and ladder fuels while enhancing and maintaining forest health and key habitat components for the spotted owl. Possible treatment tools include single tree and group selection tree regeneration methods, intermediate thinning, and stand improvement thinning. Trees would be thinned to a residual basal area between 60 to 90 ft²/acre in ponderosa pine-Gambel oak habitat. Openings ranging from 0.1 to 2.5 acres in size would be implemented across 10 to 20 percent of the treatment area. Trees greater than 24.0 inches diameter at breast height (dbh) would be retained. Tree groups would vary in shape, size, density, and number: generally less than one acre in size and 2 to 50 trees per group. Mechanical treatments would be either preceded by or followed by an initial entry or maintenance prescribed burn, depending on the implementation schedule. The focus would be to retain ponderosa pine while promoting the retention and growth of hardwoods.

Recovery Habitat Treatment, Mixed Conifer

Within dry mixed conifer Mexican spotted owl recovery habitat, mechanical harvest treatments would be designed to reduce surface and ladder fuels while enhancing and maintaining forest health and key habitat components for the spotted owl. The treatment is similar to the pine-oak recovery habitat treatment except that trees would be thinned to a residual basal area of 60 to 120 ft²/acre. The focus would be to retain ponderosa pine, Douglas fir, and Southwestern white pine, and promote hardwoods. No mechanical treatments would occur in wet mixed conifer recovery habitat.

Mexican spotted owl Prescribed Burn Treatments

The proposed action includes the use of prescribed fire to treat existing fuels and fuels generated from timber sales or thinning activities across the entire project footprint. Prescribed burning would consist of three types of burning that depends on the location within the project footprint: initial entry, pile, and maintenance burning. In some locations, all three stages may occur in the same area over a number of years. Generally an “initial entry” burn would take place first in a given area to consume naturally accumulated fuels and old logging debris. The next treatment may be a “pile” burn which would consume slash from thinning activities. The next burn would be a “maintenance” burn which would re-occur in previously burned areas to keep fuel accumulations at a level that reduces the potential for high-severity fire effects. Maintenance burns would be implemented to mimic natural return intervals every 2 –10 years depending on fuel accumulations.

Both initial entry and maintenance burns would consist of low to moderate intensity fire that would result in the consumption of surface litter, logs and mortality of smaller diameter trees. Pile burning would burn slash generated from logging and would generally be confined to activity fuels such as limbs, tops of trees and needles (activity fuels). All stages of burning could occur at any time of the year as long as conditions are favorable to meet objectives safely and are within constraints defined by resource specialists. Within nest core areas of Mexican spotted owl PACs and nest/roost replacement habitat, prescribed burning treatments would be designed to reduce surface and some ladder fuels, while enhancing and maintaining key habitat components, including high canopy cover, large trees, hardwoods, snags, and downed wood. For areas identified as dry or wet mixed conifer, fire staff will coordinate with wildlife biologists prior to implementation.

Processing Sites

Processing sites are areas larger than landings that are identified for processing and/or drying logs close to the project area. The intent is that including these sites in the proposed action would facilitate more utilization of the forest resource and increase transportation efficiencies. Tasks carried out at processing sites may include drying, debarking, chipping stems and bark, cutting logs, manufacturing and sorting logs to size, producing wood cants, scaling and weighing logs and creating poles from suitable sized logs. Equipment types commonly used at processing sites include circular or band saws, various sizes and types of front-end loaders, log loaders and chippers of several types; and may include timber processors, planers and mechanized cut to length systems, associated conveyers and log sorting bunks for accumulation and storage of logs.

Electric motors and gas or diesel generators are also used to provide power. Large processing sites are typically greater than 10 acres in size and medium-sized processing sites are 5 to 10 acres in size.

Eight processing sites are proposed for use in the CWPP and may be used as part of the project over its 20-year implementation period. Processing site location and siting considerations included the following: flat uplands less than 5% slope; more than 200 feet distant from ephemeral and intermittent stream channels (except for two sites), more than 300 feet from meadows, springs and karst features; more than 0.25 mile from Mexican spotted owl PACs and outside of northern goshawk post-family fledging areas, more than 0.25 mile from system hiking trails, campgrounds and group event recreation sites; and more than 0.25 mile from private lands, residences or offices. Processing sites were located to provide for a buffer of 100 or 300 feet from forest roads and state highways to provide for visual screening. Site boundaries identified in the EA are approximate and may be further modified during implementation and layout. Bonding or other methods will be included in the permitting of processing sites to ensure appropriate reclamation is completed after use.

Transportation System, Road Management, Maintenance and Use

The transportation system proposed for use includes a combination of existing Forest Service system roads, closed system roads that would be used during project implementation, and decommissioned and new temporary roads, some of which would be placed on existing road beds. No new permanent roads are proposed.

- The proposed action would use about 179 miles of primary haul routes for log trucks and chip vans.
- Forest Service contractors have the right to legally use public roads within and outside of the project footprint, subject to regulation by the public entity charged with jurisdiction of that roadway. In order to move timber from the project footprint to processing facilities, heavy trucks will need to use public roads through surrounding cities such as Camp Verde, Winslow, Flagstaff, and others. The Forest Service may restrict haul routes or timing of routes used by contractors on the National Forest in order to provide for public safety. The Forest Service cannot dictate the routes the contractors use once they leave the National Forest.
- The preferred alternative would use about 167 miles of Forest Service Administrative Use roads that are not designated for public motorized use. These include Maintenance Level 1 and 2 roads that are either occasionally used for administrative purposes or closed and managed for long-term storage. Following completion of work in the area they serve, these administrative use roads will be rehabilitated back to the condition they were prior to timber operations and closed to public motorized use.
- In order to support fuels reduction activities and access the project footprint for timber removal, temporary roads need to be used or constructed. A new temporary road is a primitive road created or used during vegetation treatment activities for the specific

purpose of transporting woody material from the project footprint. An estimated 45 miles of temporary roads are required as part of the CWPP proposed action. Temporary roads are designed to serve as short-term access to a specific area for timber removal and follow up treatments such as prescribed burning. About 2 miles of temporary roads are needed to access the proposed processing sites. When the new temporary road is no longer needed for the project, the road will be rehabilitated. This rehabilitation may include out-sloping, re-contouring and scarifying the road surface lopping and scattering of slash, ripping and seeding, installing adequate drainage structures such as water bars and effectively blocking the road to normal vehicular traffic where feasible pursuant with standard timber contract provisions regarding temporary roads.

- No new temporary road construction would occur within Mexican spotted owl PACs proposed for timber harvest. All roads in PACs that would be used are existing roads in the forest transportation system database and are open to public use, are administrative use roads or are decommissioned (temporary) roads with an existing road bed. All temporary roads, landings, and skid trails to be used will be pre-approved by the Forest Service Timber Sale Administrator prior to harvesting and will be constructed and located in compliance with project design features. Existing roads would be used to the extent possible for hauling harvested trees and biomass.
- No hauling will occur on the portions of Forest Roads 141 or 147 in PACs during the Mexican spotted owl breeding season unless the Forest Service determines through protocol surveys that owls are not nesting each year these road segments are proposed for use OR the Forest Service locates a nest and is able to buffer the breeding owls from noise throughout the breeding season. Either determination would be made in coordination with FWS annually. See the individual Hoot and Potato Lake PAC Treatment maps in Appendix C of the BA for more details.
- The average loads per day per timber sale area will be expected to be 8 to 10 for logs and an additional 8 to 10 loads for biomass. The number of loads per day will be tracked by the Forest Service timber sale administrator and coordination with FWS will be required if changes in these numbers occur.
- Road maintenance on roads that receive substantial use by the public are maintained by the Forest Service as funding allows. When there is a substantial increase in use of a road by a Forest Service contractor for uses such as log hauling, the associated contractor is usually required to perform maintenance both during and after their use of the road commensurate with their use. This maintenance often consists of blading and reshaping of the road surface, culvert maintenance and possible adding road surfacing material. The logging contractor will be required to maintain roads used for timber transport that are closed to the public.
- Existing rock pits closely adjacent to the project footprint that have current authorization would be used for pit run or crushed aggregate material for spot rocking and other road maintenance needs during project implementation. There are no rock pits within the project footprint. There are three existing rock sources outside of the project footprint

that may be used if needed: Lockwood Pit (T13N, R11E, Section 11) on Forest Road 96; and Cinch Hook Pit (T12N, R9E, Section 6) at the junction of State Route 87 and State Route 260 and Park Knoll Pit, (T14N, R10E, Sec. 27) off of FR 698. Access roads used to haul rock materials would also be maintained by the contractor or other user during and after use.

Conservation Measures

- Prior to the start of any treatment activities, coordinate with the Forest Service biologist to minimize potential impacts to wildlife and fish species and sensitive areas including breeding and roosting locations.
- The CWPP project footprint lies within the boundary for the Four Forest Restoration Initiative (4FRI) Rim Country project as well as other forest thinning and burning projects. Forest Service staff will work with FWS and any other entities as necessary (e.g., other stakeholders) to ensure that all proposed treatments are coordinated so that there are not multiple entries into sensitive habitats (such as PACs or occupied habitat for federally listed or candidate fish species) that are split between different project boundaries. In doing so, habitat and noise disturbance to these areas would be minimized.
- Prior to conducting harvesting activities, all skid trails, temporary roads, and landings shall be designated on a map and visibly marked by means of flagging or other suitable measures for approval by the timber sale administrator. This requirement is included in contract provision BT6.422 (landings and skid trails) and BT6.63 (temporary roads).
- Machine piling of logging slash would be done in such a manner as to minimize the construction of new clearings for slash piles through use of natural openings, temporary roads, and landings. Slash would not be piled adjacent to old trees (as defined in the large tree retention policy) or next to trees > 24 inches dbh.
- Unless waived in writing, following the completion of skidding and yarding operations in the project footprint, all landings, skid trails, and temporary roads constructed by the contractor shall be scarified by the contractor to a depth of not less than four inches and must effectively prepare the ground for seeding. If deemed necessary by Forest Service sale administration staff, the contractor shall seed with native, weed-free seed areas of exposed soil on landings, skid trails, firebreaks and temporary roads where other erosion control measures will not result in satisfactory control of soil movement. The need for seeding would be determined by the Forest Service timber sale administrator in conjunction with the Forest Service hydrologist and is included in timber sale contract provisions (WO) CT6.601# (Erosion Control Seeding) and CT6.602 (Temporary Road and Landing Scarification).
- Mexican spotted owl surveys would be coordinated with the FWS the year of implementation or one year prior to determine occupancy of owls in the project

implementation area. Surveys include the project footprint plus 0.5 mile beyond the perimeter of the project boundary.

- Information regarding implementation would be provided to FWS at annual coordination meetings, in the form of an annual report, or other requested format. This would include time of year project activities were implemented, whether project activities were implemented as analyzed, relevant Mexican spotted owl survey information, and any other pertinent information about the project's effects on individual owls, to the extent possible.
- No mechanical or prescribed fire treatments will occur within PACs during the breeding season unless non-breeding is confirmed that year per surveys using the FWS survey protocol. Coordination with FWS regarding determinations of non-nesting status and buffers is required for any treatment activity to occur in a PAC during the breeding season.
- Avoid mechanical treatments, hand thinning, hauling, and road maintenance within PACs and within 0.25 mile of PACs during the breeding season (March 1 to August 31) that could result in disturbance to nesting owls. If the Forest Service determines through protocol surveys that spotted owls are not nesting the year of a proposed activity or locates a nest and is able to buffer the breeding owls from noise throughout the breeding season, then this restriction would not apply. Coordination with FWS regarding determinations of nesting status and buffers is required for these activities to occur in a PAC or within 0.25 mile of a PAC. None of these activities are proposed in nest cores. Exceptions to this measure would occur for hauling and three of the five priority areas. Hauling along Forest Roads 95, 123, and 139 would occur during the breeding season as they are not within PACs and vegetation and topography features would minimize noise disturbance. Mechanical treatments and hand thinning in PACs would still comply with the measure, but treatments within the 0.25 mile buffer of the individual PACs in three of the five priority areas (General Springs, Kinder Springs, and McCarty Ridge) would occur for up to two consecutive breeding seasons to reduce the time needed to complete them.
- In recovery habitat, manage for large oaks by removing conifers up to 18 inches dbh that do not meet the "old tree" definition within 30 feet of oak 10 inches diameter at root collar or larger. Trees larger than 18 inches may be removed to manage for large oaks in conformance with the old and large tree implementation plan.
- Development of prescriptions for mechanical treatments and hand thinning in all owl habitats are required to involve FWS and Forest Service biologists.
- To minimize the collisions with owls, if hauling will occur in the 2 hours prior to sunrise or after sunset, the speed limit for log trucks in the action area would be 15 mph. If an owl or raptor is hit, the FWS will be notified immediately so that the specimen can be collected and documented.

- Minimize prescribed burning in PACs or within 0.25 mile of PACs during the breeding season (March 1 to August 31) that could result in disturbance to nesting owls from smoke or noise. If the Forest Service biologist determines through protocol surveys that spotted owls are not nesting the year of a proposed activity or locates a nest and is able to buffer the breeding owls from disturbance during implementation of the burn(s), then this restriction would not apply. Coordination with FWS regarding determinations of nesting status and buffers is required for prescribed fire to occur in a PAC or within 0.25 mile of a PAC during the breeding season.
- Pile burning would occur in PACs during the fall/winter to minimize impacts from smoke on nesting owls. Initial entry and maintenance burning within PACs could occur during the breeding season but would require coordination with the FWS and Forest Service biologist.
- Prescribed fire would be allowed to enter nest cores only if it is expected to burn with low fire severity and intensity. Fire management tactics including burning when relative humidity is higher and backing fire into drainages would be used to reduce fire effects and to maintain key habitat elements (e.g. hardwoods, large downed logs, snags, and large trees).
- Coordinate burning spatially and temporally to limit smoke impacts to nesting owls (March 1 to August 31).
- Protect large snags and logs wherever possible through site preparation, implementation planning, and ignition techniques to retain an average of 1 – 2 snags per acre ≥ 18 inches dbh and ≥ 3 logs with >12 inches mid-point diameter and ≥ 8 feet in length in ponderosa pine-Gambel oak; an average of 3 snags per acre ≥ 18 inches dbh and an average of 3 logs with >12 inches mid-point diameter and ≥ 8 feet in length in dry mixed conifer; and an average to 1 – 5 snags per acre >18 inches dbh and large logs depending on seral stage in wet mixed conifer.

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 § 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment.

The CWPP area is approximately 55 miles south of Flagstaff and 5 miles east of Clint's Well, Arizona in Coconino County (Figure 1) and is located entirely within the Mogollon Rim Ranger District of the Coconino National Forest. The project footprint is approximately 64,433 acres in size and vegetation consists primarily of ponderosa pine and mixed conifer forest. The action area for this project is defined as the project footprint between Forest Roads 300, 95, 139, and State Route 87 plus a 0.25 mile buffer (Figure 1) and includes the C.C. Cragin Reservoir (Reservoir). The 0.25-mile buffer is included to analyze potential indirect effects to aquatic

habitats downstream and disturbance effects to Mexican spotted owls adjacent to the project boundary.

STATUS OF THE SPECIES AND CRITICAL HABITAT

The information in this section summarizes the rangewide status of each species that is considered in this BO. Further information on the status of these species can be found in the administrative record for this project, documents on our web page ([Arizona Ecological Services Office Documents by Species](#)), and in other references cited in each summary below.

Mexican spotted owl

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) (USFWS 2012a, p. 9). 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 National Forest [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 has occurred during the 2014-2016 breeding seasons on National Forest System (NFS) lands. The Recovery Team, Forest Service, and the Bird Conservancy of the Rockies (BCR, 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 BCR, 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 2012a), 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.

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 severely burned areas, habitat is often lacking for nesting and roosting in these areas, particularly when high severity fire affects large patches of habitat (Jones *et al.* 2016). 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.

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.

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.

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.

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 feet 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.

Mexican spotted owl critical habitat also includes some steep-walled rocky canyonlands that occur typically within the Colorado Plateau EMU, but also occur in other EMUs. This habitat does not occur within the action area of this consultation, so the PCEs are not included here or analyzed in this BO.

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 BOs for the National Forests in the Southwestern Region of the Forest Service (i.e., see 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., Frye Fire and 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.

Critical habitat for this species has been designated within the project area and may be affected by the proposed action.

Previous Consultations

Given the wide-range of this species, several Federal actions affect this species every year. The formal consultations conducted for the Mexican spotted owl in Arizona can be found on our [AESO website](#).

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 project area is dominated by ponderosa pine and mixed conifer forest communities. Inclusions of aspen, meadows, perennial and intermittent 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 for this BO is defined as the areas proposed for mechanical and hand 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).

Status of the species and critical habitat within the action area

The action area contains both PAC and recovery habitats as defined in the Recovery Plan for the Mexican spotted owl, First Revision (USFWS 2012a). PACs are occupied activity centers that meet the definition of an owl site as defined in the Recovery Plan. Recovery habitat is defined as suitable, currently unoccupied habitat (outside of PACs) and is divided into two types: those areas that are identified as future nesting and roosting habitats, referred to as nest/roost replacement recovery habitat, and those habitats that are identified for all other uses, referred to as foraging/non-breeding recovery habitat.

Protected Activity Centers (PACs)

The CWPP analysis area lies entirely within the UGM EMU. PACs are intended to sustain and enhance areas that are presently, recently, or historically occupied by breeding Mexican spotted owls. Within the overall project area, there are 32 PACs totaling 19,471 acres. Approximately 17 percent of the total PAC acreage (~3,040 acres) within CWPP consists of nest cores. The PAC and nest core acres within the project areas are listed in the final BA (Table 9, pages 26-27). The Forest Service conducted surveys most recently in these PACs in 2016-2018, and found all to be occupied during at least one breeding season during this period of time (see Table 10, page 29 in BA; Potato Lake owl heard in 2018).

There are eight additional PACs within the action area outside of the project footprint: Barber Lake (601 acres), Dane Barber (603 acres), Horse Crossing (638 acres), Lockwood Draw (647 acres), Maverick Canyon (606 acres), Middle Tank (601 acres), Quail Springs (602 acres), and Valley (605 acres).

Recovery Habitat

There are approximately 17,885 acres of recovery (suitable but unoccupied) habitat within CWPP. There are approximately 10,051 acres of mixed conifer and approximately 7,834 acres of ponderosa pine-Gambel oak habitat. 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. The Forest Service identified 1,374 acres of mixed conifer and 176 acres of ponderosa pine-Gambel oak that they intend to manage as nest/roost replacement habitat within the CWPP area.

One of the primary threats to Mexican spotted owls is the potential loss of habitat from high-severity fire effects, and we encourage and support efforts to reduce the risk of high-severity fire effects to the owl and its habitat. The Final EA states that approximately 17% of the forested area has the potential for active crown fire where the entire tree canopy is lost to fire and about 36% of the area has the potential for passive crown fire in which individual or small groups of trees torch out, but solid flaming in the canopy is not likely to be maintained except for short periods (Table 3). The remaining 47% of the forested area has the potential for a surface fire only. The fire and fuels specialist report provides information indicating that existing condition is 47% surface fire, 36% passive crown fire, and 17% active crown fire.

Table 3. Crown fire potential for the project area, PAC, and recovery habitat in CWPP.

Existing Condition	Surface	Passive	Active	Total
Entire Project Area	~47% (30,283 acres)	~36% (23,196 acres)	~17% (10,954 acres)	100% (64,433 acres)
PAC Habitat	~59% (11,316 acres)	~28% (5,372 acres)	~13% (2,583 acres)	100% (19,271 acres) ¹
Recovery Habitat	~64% (11,394 acres)	~26% (4,626 acres)	~11% (1,859 acres)	100% (17,879 acres)
Total Owl Habitat	22,710 acres	9,998 acres	4,442 acres	37,150 acres

¹The total PAC acres for fire modeling is 200 acres less than that reported above because the PAC boundaries include water and other areas not used in the modeling exercise.

Critical habitat

The CWPP project area is located within Mexican spotted owl critical habitat unit (CHU) UGM 10. This CHU encompasses approximately 562,988 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 CWPP project area, there are approximately 18,947 acres of protected and 16,898 acres of recovery habitat that are critical habitat (Table 4). These acres occur entirely within the PAC and recovery habitat acres described above. The total acres of critical habitat are slightly lower than those for PAC and recovery habitat analyzed in the Mexican spotted owl section above as there is a small portion of the project footprint that is not included in the CHU boundary.

Table 4. Designated critical habitat acres within CWPP.

Owl Habitat Category	Mixed Conifer	Pine-Oak	Total
PAC	11,469 acres	7,478 acres	18,947 acres
Recovery	9,064 acres	7,834 acres	16,898 acres
Total Acres	20,533 acres	15,312 acres	35,845 acres

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 within the action area. Key factors that have affected the owl within the action area are historical and recent vegetation removal activities; fire and fuels management; utility corridor vegetation management; 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.

A review of over 30 fires from 1979 to 2017's Highline Fire identified 447 acres of high intensity fire across the 64,433 acre project area ranging from less than an acre to 72 acres with an average patch size of 3 acres. Given high intensity fire has effected 0.7% of the project area in the last 38 years, the effect of high severity fire on forest structure and tree density to date is relatively small.

The CWPP project area is of high scenic, cultural, wildlife, and recreational value. Public use of the project area is very heavy, with many heavily-used roads and trails (for both motorized and non-motorized use) and extensive camping, particularly in the late spring through late fall.

There is overlap between the proposed Rim Country Forest Restoration Project action area and CWPP EA analysis area. Consistency between the proposed actions will be maintained as each project moves through the analysis process to ensure there are no conflicts between forest restoration and the CWPP proposals. The Rim Country will receive separate section 7 consultation under the Act.

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, which 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 CWPP 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

Thinning 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. 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. The proposed action attempts to follow the Recovery Plan recommendations with one exception: prescribed burning may need to be completed in PACs during the breeding season

given there is coordination and agreement with FWS prior to implementation. The acres of Mexican spotted owl habitat proposed for thinning and burning treatment under the proposed action are listed in Table 5.

Approximately 1,636 acres in 16 PACs, or approximately eight percent of the PAC habitat in the project footprint, will be mechanically thinned. This includes 483 acres of mixed conifer PAC habitat and 1,153 acres of ponderosa pine-Gambel oak PAC habitat. The BA provides information about the PACs proposed for mechanical treatment, including acres to be treated and general descriptions of the types of treatments proposed (pages 36-37). The Forest Service also provided us maps of the acres and treatment type proposed for each of the 16 PACs (Appendix F, BA).

No mechanical treatments or hand thinning would occur in nest/roost replacement recovery habitats or any wet mixed conifer foraging/non-breeding habitats. Mechanical treatments and hand thinning in foraging/non-breeding habitats in the project footprint would occur on approximately 13,238 acres, or approximately 81 percent of this habitat type in the project footprint. This would include 7,066 acres of mixed conifer and 6,172 acres of pine-oak, which is also 81 percent of the two habitat types present in the project footprint.

Table 5. Acres of proposed treatments in Mexican spotted owl habitat in CWPP.

Mexican spotted owl Habitat Type	Thin and Burn (acres)	PCT and Burn (acres)	Burn Only (acres)	Total Acres
PAC: Mixed conifer	270	213	11,425	11,908
PAC: Pine-Oak	1,089	64	6,225	7,378
Recovery Habitat: Mixed conifer	7,066	0	1,611	8,677
Recovery Habitat: Pine-Oak	6,172	0	1,486	7,658
Nest/Roost Replacement: Mixed conifer	0	0	1,374	1,374
Nest/Roost Replacement: Pine-Oak	0	0	176	176
Total Acres	14,597	277	22,327	37,171

Proposed treatments in PACs can be divided into three categories: hand thinning of ladder fuels, creating openings in areas where the canopy is contiguous, and a combination of the two treatments. Hand thinning of ladders fuels would occur on approximately 277 acres in four PACs (Blue Ridge, Mud Springs, Panda, and Telephone Ridge). Approximately 13 of these acres would be around the Blue Ridge campground in the Blue Ridge PAC to create defensible space around the campground. The remaining 264 acres of proposed hand thinning would occur

along Forest Road 308 in Mud Springs PAC, Forest Road 139A in Telephone Ridge PAC, and along Forest Road 95 in Panda PAC. This thinning is focused on reducing ladder fuels (trees less than nine inches dbh) adjacent to these major roads so that options for fire management are improved in these areas. Proposed treatments in approximately 243 acres of the Fred Haught, Quien Sabe, and Turkey PACs would be focused on creating small openings (less than 1 acre) in the canopy of areas that are currently comprised of similar age trees. By creating discontinuity in the canopy, the potential for crown fire to spread in these areas would be reduced. On the remaining approximately 1,116 acres in eight PACs (Budapest, Clearcut, Dirty Neck, Hoot, Immigrant, Mid Miller Canyon, Miller Canyon, and Potato Lake), a combination of reducing ladder fuels and creating openings would occur. Prescriptions for treatments in PAC habitats would be designed in conjunction with the FWS and Forest Service biologist and retain key habitat components including hardwoods, large trees, snags, and logs, and high canopy cover.

Proposed mechanical treatments and hand thinning can change the structure of prey habitat, affecting the composition and abundance of prey in the short-term (one to two years depending on climate and moisture) through loss of vegetation and soil rutting and compaction through the use of logging equipment. Conversely, openings created in owl PAC and recovery habitat and retention of desired levels of coarse woody debris and logs would improve cover and food resources for prey over the long-term. Openings would allow for an increase in sunlight reaching the forest floor and result in an increase in the density and diversity of grasses, forbs and shrubs. Although mechanical treatments would be expected to have effects to owls and their habitats and prey in the short-term, proposed treatments would increase the structural and species diversity of overstory and understory vegetation while reducing the risk of stand-replacing fire. This would benefit the species and its habitats in the long-term.

Prescribed Fire

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). Effects from prescribed fire in pine-oak and dry mixed conifer habitats would be expected to be greater than those in wet mixed conifer habitats. Wet mixed conifer habitats are located in wetter portions of the forest (e.g., drainage bottoms and lower slopes) where fire does not carry except under the most extreme conditions. In these areas, when fuel moistures are low, groups of trees would be expected to torch as a result of the existing high density of trees and fuel loadings. This will create openings in the canopy. When conditions are wetter, fire tends to stay on the surface and will consume the duff layer, small to medium sized woody debris, and portions of larger logs. Along the ridgetops, which pine-oak and dry mixed conifer habitats, fuels are drier and fire in these areas is likely to kill the smaller trees (less than nine inches dbh) by heat or flames, but we would expect very little torching of overstory trees.

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 (≥ 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 ≥ 3 to < 9 inches dbh), with little change in larger (≥ 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 (≥ 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, prescribed burning is expected to reduce the risk of high severity fire 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. Since prescribed burning in wet mixed conifer stands would occur in the early spring and fall when

fuel moistures are higher, fire behavior would generally involve creeping and smoldering in ground fuels with some unburned areas. Fire severity under these conditions would be expected to be low. Single and occasional group tree torching could occur during prescribed burns in pine-oak and dry mixed conifer habitats during these same times of year. This would result in the creation of small openings typically less than an acre in size, mimicking gap processes that occur under natural conditions (historic wildfire, windfall, and historic pest and disease outbreaks). Prescribed fire would also reduce ladder fuels in owl habitats by raising the crown base heights of trees, or the lowest height of individual trees above the ground, by killing the lower branches on larger trees and crown density by killing small trees. Creating openings and reducing ladder fuels and crown density would reduce competition between trees for space, water, and sunlight and promote growth of trees of all size classes, including large trees.

These changes would also increase structural diversity in owl habitats. Reducing ladder fuels and crown density would improve the resiliency of owl habitats in pine-oak and dry mixed conifer and reduce the potential effects of high severity fire across the project footprint over the long-term. 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 CWPP 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

Effects to individual owls could be caused by activities including road construction and maintenance, hauling of logs, and road rehabilitation. No new temporary roads would be created to implement mechanical treatments in PACs as all acres proposed for treated would be within skidding distance of an existing system road or decommissioned road. Approximately 0.49 mile of decommissioned roads with existing road beds would be used to implement mechanical treatments in the Hoot and Potato Lake PACs. There would be approximately 9.71 miles of temporary roads proposed within 0.25 mile of ten different PACs (Blue, Blue Ridge, Clearcut, Dirty Neck, Hunter, Little Springs, McCarty, North Miller, Rock Crossing West, and Turkey) (Table 15). This includes approximately 4.80 miles of decommissioned roads and approximately 4.91 miles of new temporary roads.

Since no new temporary roads would be needed to implement mechanical treatments proposed in PACs, there would be no clearing within PACs to establish new roads. Clearing of vegetation on approximately 0.49 miles of decommissioned roads in the Hoot and Potato Lake PACs and creation of skid trails and landings would occur during implementation of mechanical treatments. Potential effects would be minimized by using existing road beds for limited miles of temporary roads and openings and disturbed areas as landings in PAC habitats and through required rehabilitation of these features after treatments are completed.

Temporary road construction and maintenance of existing roads inside PACs and within 0.25 mile of a PAC in the action area would occur outside of the breeding season with two exceptions. First, if protocol surveys that year confirm owls were not nesting, thinning and related activities could occur during the breeding season after coordination with FWS. Second, if an assessment to identify topographic features and other relief that could dampen and dissipate noise were to be completed in conjunction with FWS, some activities related to mechanical treatments could potentially occur during the breeding season. Under this condition, project activities would occur during daylight hours, so effects to foraging birds from mechanical treatments and road maintenance and construction would not be expected. Also, as described in the CWPP Implementation Strategy (see Appendix D for more details), mechanical treatments adjacent to PACs would only occur in one of the three priority areas in a given breeding season, further minimizing potential effects to owls. Any exceptions to this would be made in conjunction with FWS on a case-by-case basis. As a result of these factors, disturbance of owls from these activities would be expected to be insignificant.

A major concern regarding effects to individual owls from the preferred alternative would be from hauling. Hauling may cause noise disturbance to nesting owls, but more importantly, vehicles do hit owls, which can result in injury or death. Main haul routes have been identified for CWPP, and many of them are located within 0.25 mile of at least one of the 32 PACs in the project footprint or the six PACs along the east boundary of the project (Barber Lake, Dane Barber, Horse Crossing, Lockwood Draw, Maverick Canyon, and Quail Springs). No hauling would occur during the breeding season in or directly adjacent to PACs along Forest Road 308, which bisects the Mud Springs PAC and is immediately adjacent to the nest core, or Forest Road 139A, which runs through the middle of the Telephone Ridge PAC, as topography and vegetation alone would not reduce potential noise effects to nesting birds. Forest Road 141 passes through Hoot and Potato Lake PACs along East Clear Creek. Forest Road 95 is immediately adjacent to Panda, Quien Sabe, Quail Springs, Horse Crossing, Lockwood Draw, and Hunter PACs and is within a 0.25 mile of Budapest, Pinchot, and Panda PACs. The Forest Service states that all of the nest cores in these PACs are 0.25 mile or greater from Forest Road 95; however, the nest core is where the birds nest and roost, they forage over much larger areas, within and outside of the PACs. The haul routes run adjacent to and near many PACs, and a PAC makes up only a small portion of an owl's home range. The analysis area has one of the highest concentrations of Mexican spotted owls in the Upper Gila Mountains EMU and is expected to include a substantial amount of hauling associated with treatments. We expect that due to the number and proximity of roads to PACs, that if hauling is as described in the proposed action, there is a high likelihood that owls will be hit by logging trucks or vehicles associated with the logging project.

Nest and roost sites within the action area are located along the slopes of drainages and the identified haul routes for CWPP are in the uplands above. Topography and vegetation will likely help dissipate hauling noise and minimize disturbance to nesting and roosting owls along both roads and most logging traffic would occur during day time hours when owls are typically inactive. However, trucks will also likely be operating early in the morning or at dusk when owls would be foraging in the action area. Therefore, an increase in the potential for collisions from project activities compared to normal traffic in the area would be expected. To minimize

these effects, if trucks are driving during the two hours prior to sunrise or after sunset, the speed limit will be 15 mph.

In the April 25, 2018, amendment to the BA, the Forest Service changed the proposed action in regards to the number of loads that could occur near PACs. In the original BA, it was stated that the maximum number of loads per project area per day would be 10, although three to five loads per day would be the expected average, and the number of loads per day would be tracked by the Forest Service timber sale administrator. The Forest Service now thinks that the average number of loads per day per timber sale area to 8 to 10 for logs and an additional 8 to 10 loads for biomass and did not specify a maximum number of loads per timber sale per day. This means that there could be more than 20 loads per day driving through the project area, which includes a very high density of Mexican spotted owls. Therefore, even with the reduced speed required during high owl activity hours, it is likely that the increased exposure to large trucks moving through the area as a result of CWPP will result in harm to Mexican spotted owls due to the significant increase in the potential for vehicle collisions throughout the project area.

Creation of temporary roads, landings and skid trails and maintenance of existing roads would be needed in owl habitats in order to accomplish mechanical treatments. Similar to the effects of mechanical treatments, construction of temporary roads and use of skid trails and landings could result in changes in habitat structure. These activities could result in effects to understory vegetation that could have short-term effects (generally one to two years, depending on climate and moisture) on prey availability in a given area. To minimize these potential effects, the Forest Service will ensure that disturbed areas are rehabilitated following use, and machine piling of logging slash will be conducted so as to minimize the construction of new clearings for slash piles through use of natural openings, temporary roads, and landings. The construction of temporary roads, landings, and skid trails could result in the loss of key habitat components such as large trees, snags, and downed wood, but this represents a very small amount of owl habitat in the project footprint. Standard Forest Service timber contract clauses require that, prior to conducting harvesting activities, all skid trails, temporary roads, and landings be designated on a map and visibly marked by means of flagging or other suitable measures for approval by the Forest Service timber sale administrator. This would allow the sale administrator to work with the Forest Service biologist to minimize effects in Mexican spotted owl habitat from the placement of these features.

No temporary roads would be created in nest/roost replacement habitats or any wet mixed conifer foraging/non-breeding habitats. A total of approximately 9.02 miles of temporary roads would be located in foraging/non-breeding habitats to implement mechanical treatments. This includes approximately 4.80 miles of decommissioned roads with existing road beds and approximately 4.22 miles of new temporary roads. Of these miles of new temporary roads, approximately 0.38 mile would be used to access three of the proposed processing sites (9729A, 399, and 6096/6097). All temporary roads would be rehabilitated after use.

Disturbance

No mechanical treatments or hand thinning would occur within nest cores nor would they occur in PACs during the breeding season (March 1 through August 31) unless surveys in that year

confirm non-nesting. Mechanical treatments and hand thinning adjacent to PACs would occur in upland areas above the drainages used by nesting owls in the action area, so topography and vegetation would be used to dissipate noise and minimize effects to breeding owls. Additionally, if trees are skidded and decked and personal use or commercial wood products contracts issued to remove the logs, locations of decks would be coordinated with the Forest Service biologist to further minimize effects to individuals. Treatments in areas within 0.25 mile of PACs would not occur during the breeding season, unless protocol level surveys confirm owls were not nesting the year of the proposed activity or surveys locate a nest or, in coordination with FWS, a buffer is implemented that protects breeding owls from noise throughout the breeding season. The only exception to the 0.25 mile buffer is in approximately 3,134 acres that are located within 0.25 mile of PACs in the General Springs, Kinder Spring, and McCarty Ridge priority treatment areas. Mechanical treatments and hand thinning on these acres could occur during the breeding season, but would be limited to one mechanical treatment over no more than two breeding seasons, reducing the duration of potential disturbance to owls. Additionally, to minimize the number of PACs affected in a given year by this exception, treatments would occur within the 0.25 mile buffer in only one of the three priority areas in any given year.

Disturbance of individuals may also occur as a result of chainsaws and other equipment used in fireline preparation and helicopters, if used during firing operations. Similar to mechanical treatments, these activities would occur in upland areas, so topography and vegetation would potentially buffer noise effects to owls. Implementation of spring burns in PAC habitats would be coordinated with the Forest Service biologist and FWS, but no prescribed burns would occur in PACs where owls are known or suspected to be nesting during a given breeding season. This stipulation will minimize the potential effects of smoke to adult owls and young, and minimize the potential for nestlings and immobile young to be affected directly by heat and flames.

Disturbance of owls could occur as a result of prescribed fire and related activities. Smoke from initial entry and maintenance burning and pile burning may temporarily displace Mexican spotted owls. Burning would be managed to minimize the accumulation of smoke in PACs during the breeding season (see Resource Protection Measures 1). Short-term effects from smoke would be reduced by coordination and timing and type of burning with wind direction, topography, time of year, distance to PACs, and the limiting the number of PACs and acres in each PAC burned during the breeding season. Portions of no more than 5 PACs would be burned in any given breeding season. Prevailing southwest winds and the topography of the area typically act to lift smoke, carrying it away from ignitions sites, especially in the spring. Implementation of these measures would reduce, but not completely remove, the potential for smoke effects to Mexican spotted owls as a result of implementing CWPP.

Processing Sites

None of the eight proposed processing sites would be located within 0.25 mile of any PAC in the action area; therefore, disturbance to breeding owls associated with these PACs would be expected to be insignificant and discountable as noise from the use of these sites would be dissipated by distance, topography and vegetation. Three proposed sites would be located in stands identified as Mexican spotted owl foraging/non-breeding recovery habitat (sites 9729A,

¹ These are referred to as Design Features in the Environmental Assessment

399, and 6096/6097). The three sites would be five to nine acres in size (totaling approximately 19 acres) with Site 399 located in mixed conifer forest and the other two sites in pine-oak forest. These three sites are in areas previously disturbed by recreation activities or fire and sites would be rehabilitated after use. A decrease in habitat quality for owls at these three locations and in areas immediately adjacent would occur over the next two decades from the removal of most, if not all, vegetation at these three sites, as well as the increase in noise and activity.

Summary of Effects

In summary, the implementation of thinning, prescribed burning, transportation (hauling and road maintenance), and creation/use of processing sites will result in some short-term adverse and long-term beneficial and potentially adverse effects to Mexican spotted owls and their habitat.

- No mechanical treatments or hand thinning are proposed in nest cores, nest/roost replacement recovery habitats, or wet mixed conifer habitats. There would be mechanical treatments and hand thinning in approximately 1,636 acres of PAC habitat and 13,238 acres of foraging/non-breeding recovery habitat. These treatments would have short-term adverse effects to the herbaceous understory, but long-term beneficial effects through reductions in ladder fuels and creation of openings that would improve overall habitat resilience to fire, structure, and function.
- No mechanical treatments or hand thinning work would occur in PACs during the breeding season. To facilitate the implementation of mechanical treatments and hand thinning in the General Springs, Kinder Spring, and McCarty Ridge priority areas, treatments could occur without a breeding season restriction for the approximately 3,134 acres that are within 0.25 miles of 12 different PACs. Treatments would occur for no more than two consecutive breeding seasons for any one PAC. After two breeding seasons, no mechanical treatments or hand thinning would occur within 0.25 mile of a PAC during the breeding season unless protocol surveys determined owls in a given PAC were non-nesting in that year.
- Burning activities and some road maintenance activities would take place during the breeding season within PACs, but only burning could occur in nest cores during the breeding season. Burning during the breeding season in a PAC will not occur without coordination with the FWS. Burning activities would be designed to limit smoke and effects to nesting birds and young during the breeding season. Pile burning would be completed outside of the breeding season.
- No temporary roads would be created in PACs or nest/roost replacement recovery habitats. Short-term effects to plant through ground disturbance would occur along the 9.02 miles of temporary roads located in foraging/non-breeding recovery habitat. Temporary roads would be rehabilitated after use. Hauling would not occur during the breeding season on Forest Roads 308 and 139A as they bisect two PACs and are immediately adjacent to nest cores. Hauling would occur on Forest Roads 141, 147, 95, and 139 year-round as the owls in the PACs along these roads are located in the drainages

and topography and vegetation would dissipate the effects of noise. However, although noise may be dissipated, this does not reduce the potential for owl collisions to occur along these roads.

- None of the eight proposed processing sites would be located within 0.25 mile of any PAC in the action area. Three of the proposed sites would be in recovery habitat, but are in areas previously disturbed by recreation activities or fire and sites would be rehabilitated after use.

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 CWPP. 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 (35,845 acres) within the CWPP 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 CWPP 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). 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. 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. Over time, these 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: 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 ≤ 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 using lighting techniques to avoid snags). 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 CWPP, 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 CWPP. Plant species richness would increase following thinning and/or burning treatments that result in small, localized canopy gaps. The CWPP 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, the function and conservation role of this PCE would not be compromised by the proposed action.

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 are 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 CWPP 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 CWPP 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 CWPP 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 CWPP 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 CWPP 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 CWPP'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 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.

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 CWPP 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 CWPP 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 within the project area are the 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.

There are three non-Federal inholdings within the project footprint (totaling approximately 557 acres). Two of these inholdings, the one between Forest Roads 95 and 139 (which is more than 0.5 mile from any PAC) and the one just south of SR 87 between the Little Springs and Blue PACs, have been thinned in the past. Both sites consist of ponderosa pine forest on flat slopes that lack the canopy closure, density of large trees, and, in the case of the site between Forest Roads 95 and 139, the Gambel oak component to be considered suitable owl habitat. While additional thinning of trees and development for residential use could occur at either of these sites over the next 20 years, which is the life of the project, we are not aware of any specific plans at this time.

Salt River Project (SRP) owns the third inholding that includes the C.C. Cragin Reservoir dam and the related infrastructure on the flats on the north and south sides of the dam. While the forested areas on the flats lack most of the key habitat components of owl habitat, the steep slopes adjacent to these areas include suitable Mexican spotted owl habitat. This property is immediately adjacent to the Rock Crossing and Hart Point PACs. In 2017, SRP constructed a helispot on this property, which included the removal of approximately 50 trees on 0.5 acre and the placement of gravel across the area. It is likely that maintenance of infrastructure and thinning of trees to protect infrastructure on the flats outside of potential owl habitat will continue to occur on this property. The potential effects related to SRP's activities could result in disturbance to individual owls in the PACs adjacent to these properties.

JEOPARDY AND ADVERSE MODIFICATION ANALYSIS

Section 7(a)(2) of the ESA requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

“Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and

recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). The following analysis relies on four components: (1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species' survival and recovery needs; (2) 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) Effects of the Action (including those from conservation measures), 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. The jeopardy analysis in this biological opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. We evaluate the significance of the proposed Federal action within this context, taken together with cumulative effects, for the purpose of making the jeopardy determination.

Destruction/Adverse Modification Analysis Framework

The final rule revising the regulatory definition of "destruction or adverse modification of critical habitat" became effective on March 14, 2016 (81 FR 7214). The revised definition states: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

Similar to our jeopardy analysis, our adverse modification analysis of critical habitat relies on the following four components: (1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat in terms of 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 determine 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; and (4) Cumulative Effects, which evaluate the effects of future, non-federal activities in the action area on the PCEs and how they will influence the recovery role of affected critical habitat units.

Conclusion

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

- The CWPP will strive to implement the Recovery Plan (USFWS 2012a) and manage for

Mexican spotted owl recovery on the Coconino National Forest.

- Desired conditions and guidelines in the CWPP 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.
- Based on the discussion provided in the Effects to Mexican Spotted Owl Critical Habitat section above, CHU UGM 10, which will be affected by treatments conducted under CWPP, will continue to serve the function and conservation role of critical habitat for the Mexican spotted owl.

The conclusions of this biological opinion are based on full implementation of the project as presented in the Description of the Proposed Action section of this document, including any 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.

The measures described below are non-discretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest Service must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

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 OR EXTENT OF TAKE

Based upon analyses of the effects of Forest Service projects within previous forest management BOs, we anticipate the majority of incidental take for actions implemented under the CWPP 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 32 PACs within the project boundary and eight PACs immediately adjacent to the project footprint that could be affected by CWPP. Sixteen PACs have acreage that will be thinned and all 32 PACs will have prescribed fire at least twice during the life of the project.

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 CWPP. 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 to owls in up to two 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 two 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 CWPP 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 two PACs are harassed in one year as a result of this project. As described in the proposed action, protocol surveys will be conducted prior to mechanical and prescribed fire treatments and owl nesting status determined. If FWS and Forest Service biologists determine that owls in PACs adjacent to mechanical treatment areas or within prescribed burn areas are non-nesting or nesting owls are located in an area that is protected from noise disturbance (i.e., distance, topography or other factor), then we would assume that no harassment occurred to these owls during that breeding season.

- 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 (less than the project life assuming that most mechanical thinning will happen sooner rather than later). Following the discovery of two fatalities, we will re-assess the project with the Forest Service and determine how to reduce fatalities.

The FWS will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. § 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES

Mexican spotted owl

The following reasonable and prudent measure(s) are necessary and appropriate to minimize take of Mexican spotted owls:

1. The Forest Service shall monitor incidental take resulting from the proposed action and report to the FWS the findings of that monitoring.
2. The Forest Service shall conduct training for all employees and contractors regarding the conservation measures, resource protection measures to ensure these measures are implemented as analyzed.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

Mexican spotted owl

The following terms and conditions implement reasonable and prudent measure #1 for Mexican spotted owl:

- 1.1 The Forest Service shall monitor the project area and other areas that could be affected by the proposed action to ascertain effects to the Mexican spotted owl and/or loss or modification of its habitat that causes harm or harassment to the species.
- 1.2 The Forest Service shall submit annual monitoring reports to the Arizona Ecological Services Field Office (Flagstaff) by January 15 beginning in 2019. These reports shall briefly document for the previous calendar year the effectiveness of the terms and conditions and locations of listed species observed. The report shall also summarize tasks accomplished under the conservation measures and terms and conditions. The report shall make recommendations for modifying or refining these terms and conditions to enhance listed species protection.
- 1.3 The Forest Service shall immediately report any Mexican spotted owl fatality to the FWS Mexican spotted owl lead within 24 hours of finding the owl(s).

The following terms and conditions implement reasonable and prudent measure #2:

- 2.1 The Forest Service shall work with the FWS to provide training to employees and contractors on the reasoning for the conservation and resource protection measures. This training shall occur prior to employees or contractors initiating work.
- 2.2 The Forest Service will provide contractors (including truck drivers) with pictures of Mexican spotted owls (as well as other owls or raptors) and with emergency contact information so that the agency and FWS can be notified immediately if a

Mexican spotted owl is found injured or dead within or adjacent to the project area.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Forest Service must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

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.

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 FWS and other partners (e.g., Northern Arizona University) to improve the existing and predicted future vegetation cover types data layers (e.g., ponderosa pine, ponderosa pine-Gambel oak, dry mixed conifer, and wet mixed conifer) within and adjacent to this project area. This information will aid in assessing post-project effects to Mexican spotted owls and other forest-dependent species.
2. We recommend that the Forest Service work with FWS and other interested partners to conduct a landscape-level risk assessment (as described in the Recovery Plan), to strategically locate and prioritize mechanical treatment units to mitigate the risk of large, high severity wildland fires (in and outside of PACs).
3. We recommend that the Forest Service work with FWS, Arizona Game and Fish Department (AGFD), and other interested partners to assess the effects of the proposed mechanical and prescribed fire treatments on the perennial drainages. Although we hypothesize that effects to perennial water and native aquatic species habitat will be minimal from the proposed action, because stakeholders have raised concerns regarding

potential effects, we should address this issue and ensure that best management and implementation practices are resulting in desired effects to these important waters and the species that depend upon them. Fires affect water quality and water cycle processes to a greater or lesser extent depending on fire severity. Therefore, we recommend documenting the amount of low, moderate, and high-severity fire within watersheds and the implementation of Resource Protection Measures. These efforts, combined with the ongoing AGFD/FWS fish monitoring, should be sufficient to monitor these effects.

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 for the CWPP. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where 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.

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 intentional 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 and/or eagles 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.

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 [FWS Migratory Bird Program web page](#) and [FWS Permits Application Forms](#). 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, as well at the Conservation Assessment and Strategy for the Bald Eagle in Arizona ([Southwestern Bald Eagle Management Committee website](#)).

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 the Hopi Tribe, Zuni Tribe, Navajo Nation, Yavapai-Apache Nation, and Yavapai-Prescott Indian Tribe of its completion. We also encourage you to coordinate the review of this project with the AGFD.

We appreciate the Forest Service's efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2015-F-0733 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Shaula Hedwall at (928) 556-2118 or Brenda Smith at (928) 556-2157.

Sincerely,

Laurel Barnhill
Acting Field Supervisor

cc (electronic):

District Ranger, Mogollon Rim Ranger District, Coconino National Forest, Happy Jack, AZ
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Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ
Director, Zuni Heritage and Historic Preservation Office, Zuni, NM
Director, Historic Preservation Department, Navajo Nation, Window Rock, AZ
Director, Apache Cultural Program, Yavapai-Apache Nation, Camp Verde, AZ
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Director, Environmental Programs, Bureau of Indian Affairs, Phoenix, AZ

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APPENDIX A: CONCURRENCES

This appendix contains our concurrences with your “may affect, not likely to adversely affect” determinations for the threatened Little Colorado spinedace (*Lepidomeda vittata*) and its critical habitat, and the threatened Chiricahua leopard frog (*Lithobates [Rana] chiricahuensis*).

Little Colorado spinedace and critical habitat

The Little Colorado spinedace is found in the upper portions of the Little Colorado River and its north-flowing permanent tributaries on the Mogollon Rim and the northern slopes of the White Mountains in eastern Arizona. Currently, spinedace occur in Kehl, West Bear, Bear, and Barbershop canyons and East Clear Creek above CC Cragin Reservoir within the action area. Under the preferred alternative, no mechanical treatments or hand thinning would occur in occupied or potential habitat for the spinedace. Designation of aquatic management zones (AMZs) would occur around all perennial and most, if not all, intermittent stream courses in the action area. This includes all occupied and potential spinedace habitats in the action area. In these zones, ground disturbing activities such as landings, temporary roads, and skid trails and piling of slash would be prohibited.

- No mechanical treatments or hand thinning units, and no temporary roads, skid trails, or landings would be located in occupied or suitable spinedace habitat; therefore, there will be no direct effects to Little Colorado spinedace from these actions.
- Mechanical treatments and hand thinning in uplands adjacent to spinedace habitats would reduce the risk of high-severity, stand-replacing fire in these areas and to spinedace habitat and critical habitat.
- Prescribed burning would occur adjacent to occupied and suitable spinedace habitat, but potential effects would be minimized through implementation of resource protection measures (RPMs) including timing and spatial distribution of treatments and use of varying ignition techniques such as backing fire into drainages and burning at night or during other times when humidity is higher and fire effects will be reduced. These efforts will ensure that indirect effects to habitat are insignificant and discountable.
- None of the eight proposed processing sites would be located within 0.25 mile of or drain into occupied, potential, or critical spinedace habitat. Therefore, we do not anticipate any measurable effects from these sites to spinedace habitat or critical habitat.
- Constituent elements of spinedace critical habitat consist of clean, permanent flowing water with pools and a fine gravel or silt-mud substrate. Vegetation treatments and prescribed fire activities would reduce the risk of high-severity stand-replacing wildfire, increase forest resiliency, and improve watershed condition. The RPMs, and design features, included in the proposed action will reduce and/or eliminate the potential for sediment or pollutants to enter spinedace habitat and will protect the permanent water and substrate by reducing the potential for high-severity fire and subsequent post-fire flooding.

Chiricahua leopard frog

Historically, Chiricahua leopard frogs were found in East Clear Creek and associated drainages in the project footprint. While the species has not been documented in this area for more than 40 years, suitable habitat does exist in perennial and intermittent drainages, springs, stock tanks, and lakes in and immediately adjacent to the project footprint. Potential habitat for Chiricahua leopard frogs exists in the perennial drainages in the project footprint including East Clear Creek, Miller Canyon, East Miller Canyon, Kehl Canyon, General Springs Canyon, Houston Draw, Bear Canyon, and West Bear Canyon. Some of these drainages support nonnative fish and crayfish, reducing the quality of habitat they provide for this species. There are approximately 66 earthen stock tanks (each less than ¼ acre in size) and five lakes (Baker, Dry, Dude, Huffer Spring, and Potato) within the project footprint. These areas may or may not provide potential habitat as most, if not all, lack the aquatic vegetation and vegetation along the banks preferred by leopard frogs. There are approximately 45 springs in the project footprint that could provide both potential breeding and dispersal habitat.

- The Chiricahua leopard frog is not present within the action area, so there would be no direct effects to either species.
- Project activities in the action area would have insignificant effects to potential Chiricahua leopard frog habitat. Implementation of RPMs, and standard timber contract clauses to protect streams, springs, wetlands and other aquatic features would minimize potential effects to potential habitat in the action area. Vegetation treatments and prescribed fire activities would reduce the risk of high-severity stand-replacing wildfire, increase forest resiliency, and improve watershed condition. Such changes would benefit potential leopard frog habitats in the project area.