United States Department of the Interior

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In reply refer to:
AESO/SE
02EAAZ00-2017-CPA-0012
02EAAZ00-2019-F-0041

September 19, 2019

Mr. Dale A. Deiter, Forest Supervisor
Prescott National Forest
2971 Willow Creek Road, Building 4
Prescott, Arizona 86301

RE: Hassayampa Landscape Restoration Project

Dear Mr. Deiter:

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). We received your April 2, 2019, request for consultation the same day, via electronic mail. At issue are effects that may result from the proposed Hassayampa Landscape Restoration Project located in Yavapai County, Arizona. The proposed action may affect the threatened Mexican spotted owl (*Strix occidentalis lucida*, owl or MSO) and its designated critical habitat.

In your letter, you requested our concurrence that the proposed action "may affect, but is not likely to adversely affect" the threatened Gila trout (*Oncorhynchus gilae*). We concur with your determination and include our rationale in Appendix A.

We based this biological opinion on information provided in the April 2, 2019, biological assessment (BA), the June 20, 2018 environmental assessment (EA), the January 10, 2017, project proposal, 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 fuels reduction treatments 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

- January 2017: The Forest Service submitted scoping document and draft EA to Arizona Ecological Service for review. We met with Prescott National Forest personnel and provided scoping comments.
- August 30, 2017: We participated in a field meeting with the Prescott National Forest to visit the project area.
- April 10, 2018: We provided comments to the Forest Service on the draft EA.
- June 20, 2018: The Forest Service published the Final EA for the Hassayampa Landscape Restoration Project.
- September 2018 – November 2018: We coordinated with the Forest Service on development of the draft BA.
- April 2, 2019: The Forest Service requested to initiate formal consultation.
- May 8, 2019: We issued a thirty-day letter initiating formal consultation.
- June 11, 2019: We met with the Prescott National Forest to obtain additional information.
- July 2019: The Forest Service provided addendums to the BA.
- August 22, 2019: We sent the Draft BO to the Forest Service for review.
- September 4, 2019: We received your comments on the draft BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The complete description of the proposed action and effects analysis are in your April 2, 2019, BA, amendments to the BA, June 20, 2018, EA, and other supporting information in the administrative record. We include these documents herein by reference. This consultation covers a ten-year period to account for maintenance burns following initial fuels reduction treatments.

The purpose of the proposed action is to improve the health and resiliency of fire-adapted ecosystems by restoring and maintaining fire, as well as reducing the risk for high-severity fire, on approximately 234,515 acres of the Prescott National Forest (Forest). Fuels treatments would occur in numerous vegetation types including semi-desert grasslands, juniper grasslands, piñon-juniper evergreen shrub, interior chaparral, aspen, ponderosa pine-evergreen oak, ponderosa pine-gamble oak, desert communities, and riparian gallery forest. 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. Dry mixed conifer sites are included within the ponderosa pine-oak type in the project description. The BA includes additional information regarding vegetation types.

A combination of vegetation management treatments, including mechanized and non-mechanized fuels treatments, prescribed burning, and fuel break construction are proposed (Table 1). Prescribed burning would occur across a majority of the project area (234,276 acres); including all vegetation types except desert communities. A combination of treatments would occur throughout the project area and multiple treatment types may occur within a given area. The Forest would use both existing system and non-system roads during project implementation, and would rehabilitate all non-system roads, following implementation. The Forest Service would implement the project over the 10 years following the decision, contingent upon available funding. They would prioritize treatment areas as shown in Map 46 in the BA.

Table 1. Acreages of proposed fuels reduction treatments.

Primary Treatment	**Acres**
Mastication	44,590
Mechanical thinning	30,808
Hand thinning	4,798
Fuel breaks (mechanical)	9,616
Fuel breaks (hand thinning)	1,049
Total	**90,861**

The project includes thinning in ponderosa pine, pine-oak, and dry mixed conifer vegetation types and would include both hand thinning and mechanical treatments. Prescriptions and treatment objectives would focus on uneven-aged management and basal area ranges would vary by vegetation type and location (Table 2). Uneven-aged silvicultural practices would include

removal of both large (>18 inches diameter at-breast height [dbh]) and small (<9 inches dbh) trees. Hand thinning would occur in areas with slopes greater than 80 percent and within sensitive sites. These treatments would be carried out with chainsaws and involve removing trees up to 9 inches dbh. Operators would lop and scatter or pile cut vegetation. Fuels managers would work with other resource managers to determine the best method for managing the slash based on site-specific needs and practical methods available. Forest Service staff would ensure there is enough coarse woody debris to protect soil and any additional slash they would burn or remove. Mechanical thinning operations would include winter logging. Treatments would include both conventional ground-based and steep slope, ground-based harvest systems. Aspen treatments would use mechanical thinning to open up tree canopies and would include the removal of large conifers within and around aspen stands, as well as the removal of some large aspen. The Forest Service would designate landings on a site-by-site basis for each treatment. No landings would be located within MSO nest/roost cores.

The Forest is proposing to place fuel breaks adjacent to private property and other high value resources to improve the ability of the Forest to manage fire behavior in these areas. Fuel breaks would be linear and up to 330 feet in width. All fuel breaks would be shaded fuel breaks, unless in chaparral vegetation. Managers create shaded fuel breaks by selectively thinning and removing more flammable understory vegetation while leaving the majority of larger, more fire tolerant tree species in place. Basal area ranges within fuel breaks are in Table 2. The Forest would only fell snags if they present a hazard and they would leave felled snags in place. The Forest would pile and burn, or remove, existing dead fuels and slash following treatments (see above discussion regarding thinning slash). Mechanical maintenance of fuel breaks would occur every 7 to 10 years, depending upon vegetation regrowth. Maintenance burns would occur approximately every 2 to 10 years, depending upon ecological conditions (such as amount of fuel, weather conditions, etc.).

Prescribed burning could occur year-round, as conditions allow, with an average of 10,000 acres treated annually. Prescribed burning would include broadcast and pile burning. Construction of control lines would vary by vegetation type and structure and would be determined site specifically in the burn plans. Woody shrubs, brush, and small-diameter trees (<9 inches dbh) would be cleared up to 66 feet in width. The Forest would use a skid steer, chainsaw, or similar equipment to clear the area down to bare mineral soil with an average width of two feet. The Forest would rehabilitate all fire control lines following project implementation by knocking down berms and covering them with brush and logs. The debris placed in these areas would slow water flow, discouraging unauthorized trail use, and provide soil protection.

Treatments in Mexican spotted owl habitat

Thinning and fuel break construction would occur within MSO nest cores, Protected Activity Centers (PACs), nest/roost replacement recovery habitat, and foraging/dispersal recovery habitat. Treatments would occur within 11 of the 17 existing MSO PACs on the Forest, including 4,375 acres of thinning and 1,235 acres of fuel breaks within owl habitat (Table 3). This would include 1,054 acres of fuel breaks in PACs, 181 acres of fuel breaks in cores, 3,664 acres of thinning in PACs, and 708 acres of thinning in nest cores (Table 3). This project would also include 4,904 acres of prescribed fire in PACs and 950 acres in cores. Included in these totals is 27 acres of

aspen thinning, which would occur in three PACs (Snowdrift, Towers, and Mountain Pine Acres). Twenty acres of the 27 acres of aspen treatment are within the Mountain Pine Acres PAC nest/roost core area. Basal area target ranges vary depending upon vegetation type and MSO habitat type (Table 2). Two additional PACs are outside of the treatment acres, but are within 0.25 mile of the project area and/or haul routes.

Ponderosa pine/oak treatments

In ponderosa pine/oak communities (including evergreen oak and Gambel oak [*Quercus gambelii*]), thinning treatments would occur in 1,379 acres of MSO PAC, 182 acres of nest core habitat, 240 acres of nest/roost replacement recovery habitat, and 1,508 acres of foraging/dispersal recovery habitat (Table 2). Treatments would include mechanical thinning, hand thinning, fuel break construction, and prescribed fire. In mechanical thinning treatments, silviculturists would target all tree size classes for removal. These treatments would create 0.1-2.5 acre openings and a variety of tree-clump sizes (2.5 acres and up) within MSO habitat. Within PACs, treatments would maintain high canopy cover with the basal area in larger diameter trees. Prescriptions would emphasize vertical and horizontal heterogeneity.

Mixed conifer treatments

In the BA, mixed conifer is included within the ponderosa pine/Gambel oak vegetation type, though prescriptions within mixed conifer would have a higher basal area target range (Table 2). In mechanical thinning treatments, treatments would target trees of all sizes for removal. Thinning treatments in mixed conifer include 398 acres in MSO PACs, 266 acres in nest cores, 86 acres in nest/roost replacement recovery habitat, and 273 acres in foraging/dispersal recovery habitat. Treatments would include mechanical thinning, hand thinning, fuel break construction, and prescribed fire.

Aspen treatments

Aspen treatments would remove conifer trees in an attempt to stimulate aspen regeneration. Treatments would create linear openings (up to five acres) in aspen stands within three MSO PACs, including one nest/roost core area. The target residual conifer basal area for these treatments is 20 sq ft/ac. The Forest Service would use prescribed fire to stimulate aspen regeneration.

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, existing temporary roads, and 21 miles of new temporary roads, which operators would use during project implementation. Where possible, the Forest Service would lay out these temporary roads on previously disturbed areas. No new permanent roads are proposed. The Forest Service would not construct new temporary roads within PACs. Non-system roads would be decommissioned after operators no longer need access for mechanical treatments. The three primary haul routes for this project include the Senator Highway, Big Bug Mesa Road, and the Walker Road (Figure 1). The Forest Service anticipates

not more than 10 loads/day on these haul routes, during periods of operation.

Conservation Measures

The Prescott National Forest intends to follow their forest plan and its associated biological opinion (USWFS 2014). This includes coordinating with FWS prior to initiating any work within PACs to collaborate regarding site-specific measures to minimize effects to owls (USFWS 2014).

- The Forest would retain snags, unless they pose a hazard to personnel or do not meet the purpose and need for the project (e.g., managers would remove soft snags in fuel breaks).
- For MSO:
    - No activities may occur within MSO PACs from March 1 to August 31 each season unless formal protocol monitoring determines the owls are non-nesting. Per the Prescott Land and Resource Management Plan Biological Opinion, this breeding season timing restriction would include a 0.25-mile area beyond the boundary of each PAC (USFWS 2014). Activities associated with treatments in PACs may occur September 1 to February 28 each season with no timing restrictions.
    - The Forest would only conduct prescribed burns in PACs (including core areas) when conditions exist for low intensity fire and low severity fire effects. The Forest would not construct new roads within PACs. Unless surveys determine that owls are non-nesting, fire in PACs would only occur outside the breeding season.
    - The Forest Service or operator would obliterate all non-system roads used in the project upon completion of project activities.
- For Gila trout:
    - The streamside management zone (SMZ) is an area or strip of land adjacent to a stream or other body of water where the Forest Service plans and implements management practices in a manner that protects water quality, aquatic wildlife, and wildlife habitat. The Forest Service would clearly designate where they intend to treat vegetation in the SMZ. They would maintain riparian vegetation within the SMZ.
    - The Forest Service would not treat facultative or obligate riparian vegetation in the SMZ.
    - The Forest Service would retain sufficient vegetation to provide bank stabilization, shade, and a future source of large woody debris.
    - The Forest Service would not conduct broadcast burning within the SMZ, unless specifically identified as the proper management treatment. The goal would be to have low severity fire effects in the SMZ and avoid high and moderate burn severity.

- The Forest Service would maintain sufficient ground cover within the SMZ to trap sediment before it enters any watercourse.
- The Forest Service would design all management treatments to minimize soil disturbances and follow best management practices. A terrestrial ecosystem survey map would guide site-specific best management practices in applicable PNVTs.

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 Hassayampa Landscape Restoration Project area is to the west, south, and east of Prescott, Arizona, in Yavapai County (Figure 1) and is located entirely within the Bradshaw Ranger District of the Prescott National Forest. The project footprint is approximately 234,515 acres in size and ranges in elevation from 3,200 feet to 7,979 feet. We define the action area for this project as the project footprint and main haul roads plus a 0.25-mile buffer (Figure 1). We included the 0.25-mile buffer, as there are potentially affected owls adjacent to the project boundary and proposed haul routes that go beyond the project boundary.

STATUS OF THE SPECIES AND CRITICAL HABITAT

The information in this section summarizes the rangewide status of each species that we 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 MSO, spotted owl, and owl) as threatened under the Act (58 FR 14248) and designated critical habitat in 2004 (69 FR 53182). 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 2012).

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the owl as a threatened species (58 FR 14248), the original Recovery Plan (USFWS 1995), and in the revised Recovery Plan (USFWS 2012). We include the information provided in those documents 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 MSO 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 inhabits 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 MSO'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 2012, 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.

MSO surveys conducted 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 2012) 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 agencies completing new owl surveys within previously unsurveyed areas (e.g., several National Parks within southern Utah, Guadalupe National Park in West Texas; Guadalupe Mountains in southeastern New Mexico and West Texas; Dinosaur National Monument in Colorado; and the Cibola and Gila National Forests [NF] in New Mexico). Thus, we cannot infer an increase in abundance in the species range-wide from these data (USFWS 2012). However, we do assume that an increase in the number of occupied sites 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 2012). The effort to conduct this work has occurred during the 2014-2019 breeding seasons on National Forest System (NFS) lands in Arizona and New Mexico. 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 develop the potential strategy and funding mechanisms for collecting rangewide habitat monitoring data.

The FWS cited two primary reasons for the original listing of the MSO in 1993: (1) The historical alteration of its habitat as the result of timber-management practices; and, (2) the threat

of these practices continuing. We also identified the danger of stand-replacing fire 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 MSO. 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 2012). Recent forest management has moved away from a commodity focus and now emphasizes sustainable ecological function and a return toward pre-settlement fire regimes, both of which have potential to benefit the spotted owl. However, as stated in the revised Recovery Plan (USFWS 2012), there is much uncertainty regarding thinning and burning treatment effects and the risks to owl habitat with or without forest treatment as well. Therefore, efforts to reduce fire risk to owls should be designed and implemented to evaluate the effects of treatments on owls and retention of or movement towards desired conditions.

Southwestern forests have experienced larger and more severe wildland fires from 1995 to the present, than prior to 1995. Climate variability combined with unhealthy forest conditions may also synergistically result in increased negative effects to habitat from fire. The intensification of natural drought cycles and the ensuing stress placed upon overstocked forested habitats could result in even larger and more severe fires in owl habitat.

Currently, high-severity, stand-replacing fires are influencing the persistence ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic wildland fire is probably the greatest threat to the MSO within the action area and fire severity and size have been increasing. 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 MSO'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 affects 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). Researchers think such changes in the timing and amount of snowmelt are signals of climate-related change in high elevations (Smith *et al.* 2000, Reiners *et al.* 2003). The effect 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 MSO 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 can have a negative effect on the availability of grass cover for prey species. Recreation effects 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 MSO, including predation, starvation, accidents, disease, and parasites. For example, West Nile Virus also has the potential to effect the MSO. We have not documented the virus in spotted owls 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 affect to the owl range-wide.

Critical Habitat

The FWS designated critical habitat for the MSO in 2004 on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (69 FR 53182). Critical habitat includes only those areas in designated critical habitat units (CHUs) that meet the definition of protected (PAC and steep slopes, as defined) and restricted (now called "recovery") habitat (unoccupied owl foraging, dispersal, and future nest/roost habitat) as defined in the 1995 Recovery Plan (USFWS 1995). The PCEs for MSO 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, we identified PCEs for 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 occur 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 older, larger trees persist.

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). 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 MSO throughout all of the EMUs located in the U.S. We do not have detailed information regarding the status of the MSO 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 MSO. These wildland fire effects have mainly affected MSOs 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). However, significant wildlife effects have affected other EMUs as well (e.g., SRM EMU 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.

Previous Consultations

Given the wide-range of this species, several Federal actions affect this species every year. A complete list of all formal consultations affecting this species in Arizona is on our Arizona Ecological Services website.

ENVIRONMENTAL BASELINE

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

Status of the species and critical habitat within the action area

The Forest Service does not have complete information on the existing forest conditions or vegetation types for the project area. For the treatments proposed, vegetation cover (e.g., ponderosa pine) and habitat management type (e.g., PAC) are the primary characteristics used to determine the treatment under this analysis. Adjustments to the various treatments, acres treated and the treatment methods used may change during implementation based on actual site conditions and new information. The Forest Service would coordinate with the FWS regarding any adjustments to treatments in MSO habitat.

Protected Activity Centers (PACs)

The Hassayampa Landscape Restoration Project analysis area lies entirely within the Basin and Range West EMU. PACs are intended to sustain and enhance areas that are presently, recently, or historically occupied by breeding MSOs. By definition, we consider all PACs occupied by owls for the life of the Recovery Plan unless information indicates otherwise (e.g., habitat loss). Within the project area, there are 11 PACs that would receive 4,904 acres of treatment, of which 950 acres is within cores. Two additional PACs occur outside the treatment area, but are included in the action area due to their proximity to treatment areas and haul routes. The Forest Service conducted surveys in these PACs sporadically from 1990 through 2018. In 2018, biologists surveyed seven PACs that occur within the action area and detected at least one owl in six of the PACs (see Table 10 in BA).

There are approximately 13.1 miles of existing system roads and 7.8 miles of non-systems roads within PACs in the project area. The project area is highly fragmented by roads, power lines, and existing housing developments. High levels of recreation from adjacent private lands occur within, and adjacent to PACs. Within the action area, 11 PACs are directly adjacent to private lands, many with homes. Below, we summarize the status information each PAC.

<u>Palace</u>
The Forest Service surveyed the Palace PAC consistently from 1991 to 2005, with inconsistent surveys from 2005 until 2018 (Table 10 in the BA). Biologists last documented owls in this PAC in 2001, when they located one pair. In October of 2017, the August Fire removed the majority of the pine overstory within this PAC and the PAC currently consists primarily of oak and chaparral (not typically a cover type used by MSO). According to the Forest, both the PAC and nest core currently lack the key variables needed for MSO nesting and roosting habitat identified in the recovery plan (Table 12 in the BA).

<u>Venezia</u>
Surveys last detected owls in this PAC in 1997. The beetle-killed trees and effects from the August Fire removed much of the pine overstory from the Venezia PAC. The PAC currently consists primarily of smaller pine trees and oak stands (Table 10 in BA). According to the Forest Service, this PAC currently meets all desired habitat conditions with the exception of trees >18 inches dbh, which are lacking (Table 12 in the BA).

<u>Silver Spruce</u>
The Forest Service last documented a MSO pair, with young, in the Silver Spruce PAC in 2015 (Table 10 in the BA). They detected a single MSO in both 2017 and 2018. The Forest's stand exam data shows this PAC currently has approximately 42 trees-per-acre (TPA) >18 inches dbh. According to the Forest, this PAC consists of a dense stand of large trees and lacks openings, herbaceous and shrub understory, and diversity of both patch sizes and horizontal diversity (Table 12 in the BA).

<u>Mountain Pine Acres</u>
Surveys have consistently located owls in the Mountain Pine Acres since surveys began in 1990 (Table 10 in the BA). According to the Forest, this PAC meets nearly all the desired conditions on the east side of the PAC, but lacks diversity of patch sizes, horizontal and vertical diversity,

and openings on the west side of the PAC (Table 12 in the BA). This PAC also lacks large trees (>18 inches dbh).

Big Bug
Surveys located MSO in the Big Bug PAC in 2003. The Forest Service conducted formal surveys three times between 2004 and 2018 (Table 10 in the BA). According to the Forest, this PAC lacks patch, horizontal, and species diversity, lacks openings, and does not have sufficient large trees >18 inches dbh (Table 12 in the BA).

Grapevine
Survey results show that owls consistently occupy the Grapevine PAC since monitoring began in 2014, with one young produced in 2015 (Table 10 in the BA). According to the Forest Service, this PAC meets all the desired conditions for PAC habitat, with the exception of large trees >18 inches dbh, which are lacking (Table 12 in the BA).

Towers
The Forest Service last monitored the Towers PAC in 2017, when they detected an owl pair with two young (Table 10 in the BA). Biologists detected owls in this PAC three of the six years they conducted surveys. The PAC currently retains all desired conditions for nest/roost habitat and canopy cover (Table 12 in the BA).

Highland Pines
Surveys last detected owls in the Highland Pines PAC in 2014. Biologists detected a pair at this time; surveys have sporadically detected owls since surveys started in 1990 (Table 10 in the BA). This PAC meets all the desired conditions for PAC habitat, with the exception of large trees >18 inches dbh, which are lacking (Table 12 in the BA).

Payoff
Surveys in 2018 detected a pair in the Payoff PAC and the PAC was occupied every year it received formal monitoring, since 2013 (Table 10 in the BA). The existing conditions of this PAC were not included in the BA and are unknown (Table 12 in the BA).

Lorena Gulch
Surveys detected a pair of owls in Lorena Gulch in 1995 and a single female owl was present until 2005. The Forest Service has surveyed the PAC three times since 2005 (Table 10 in the BA). In 2008, the Lane II Fire removed much of the conifer overstory within this PAC.

Snowdrift
The Forest Service has never documented MSO reproduction in this PAC, but surveys detected a pair in 2018 (Table 10 in the BA). This PAC contains dense mixed conifer vegetation and sits amongst private property. Per information from the Forest Service, shade-tolerant species (white fir) dominate within this PAC, the stand structure is homogeneous (lacks diversity in vegetation), and the forest lacks openings and vertical or horizontal diversity (Table 12 in the BA).

Mt. Tritle
The Mount Tritle PAC was occupied on and off by a pair from 1992 until 2014 (Table 10 in the BA). Surveys detected a single owl in 2015 and 2018. The existing conditions of this PAC were not included in the BA and are unknown (Table 12 in the BA).

Transcendent
The Forest Service did not include information about the owls associated with this PAC in the BA. Surveys located a pair in 2003, 2009, and 2017, and a single unknown sex owl in 2005, 2014, and 2018. The Forest Service conducted non-protocol surveys in 2015 and did not survey the PAC in 2016.

Recovery Habitat
There are approximately 4,746 acres of recovery (suitable but unoccupied) habitat within the Hassayampa Landscape Restoration Project boundary. There are approximately 545 acres of mixed conifer recovery habitat and approximately 2,037 acres of ponderosa pine-oak recovery habitat that the Forest Service would treat with thinning, fuel breaks, and/or prescribed fire. The Recovery Plan (USFWS 2012, 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 approximately 100 acres of mixed conifer (25% would be 136 acres) and 268 acres of ponderosa pine-oak (10% would be 204 acres), which may include both evergreen and Gambel oak; however, they intend to manage as nest/roost replacement habitat within the project area (Map 45 in the BA).

Critical habitat

Within the action area, designated critical habitat is limited to areas that meet the definition of protected and recovery habitat in the recovery plan and is within the established critical habitat units (USFWS 2004). On the Prescott NF, these areas occur in the mixed conifer and ponderosa pine-Gamble oak forest types.

The Hassayampa Landscape Restoration Project is located within MSO critical habitat units (CHUs) BRW-2 and BRW-3. CHU BRW-2 (Basin and Range-West) is on the Bradshaw Ranger District in the Prescott Basin and CHU BRW-3 is on the Bradshaw Ranger District near Crown King. In CHUs BRW-2 and BRW-3, we excluded the Boundary WUI project area and the Crown King/Ash Creek WUI project area from designation (USFWS 2004). The total area of National Forest System (NFS) lands within critical habitat units on the forest is 44,814 acres. Within designated critical habitat on the forest, the total area of protected habitat is 4,058 acres, and the total area of forested recovery habitat is 6,231 acres.

Factors affecting the species and critical habitat within the action area

The action area consists primarily of NFS lands, and there are few State, tribal, or private actions effecting the MSO 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; private inholdings; human disturbance; and wildfire. The 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.

The primary factor affecting MSO habitat and critical habitat within the action area over the last decade has been vegetation removal along utility corridors to remove hazardous vegetation. Approximately 1,543 acres of MSO critical habitat is located within the action area of utility corridor projects. This acreage total includes both protected and recovery habitat composed of forested mixed conifer and pine-oak habitat. We do not know how many large, live conifers (pines and firs) greater than 18 inches dbh, large snags, conifers less than 18 inches dbh, and Gambel oak (or other hardwood tree species) were removed as a result of these actions. The removal of hazard vegetation likely resulted in effects to the size and species structure of MSO PAC, recovery, and critical habitat along utility corridors. This effect to tree species diversity and loss of certain sized trees undoubtedly resulted in adverse effects to this key habitat component and PCE. Large, live trees are an important element of MSO habitat, and research has correlated owl occupancy with a large tree component (USFWS 2012). Large trees and snags take many years to develop and are very difficult to replace, even over the long-term. Hazard tree removal also reduced large snags. The reduction of this habitat component may affect MSO nesting and prey habitat. However, since managers typically identify snags as hazard vegetation along utility corridors, it is likely this habitat component was lost within treated MSO habitat, resulting in loss of this key habitat component and PCE.

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 the Hassayampa Landscape Restoration Project on the MSO and its habitat. 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 MSOs by affecting the habitat structure including snags, downed logs, woody debris, multi-storied canopies, and dense canopy cover. Mechanical thinning would focus on uneven-aged management and may include winter logging, conventional ground-based thinning, and steep slope ground-based thinning. Target basal areas for these treatments are in Table 2.

The Forest Service proposes mechanical and hand thinning on approximately 3,664 acres in 11 PACs (not including cores) or approximately 75 percent of the PAC habitat in the project footprint. Total acres of thinning within each PAC would be variable and based upon the PAC location (Table 3). Thinning would include 398 acres of mixed conifer PAC habitat, 1,379 acres

of ponderosa pine-oak, and 27 acres of aspen. Additionally, the Forest Service would thin 708 acres in PAC core areas, or approximately 75 percent of the core habitat within the project footprint. This includes 266 acres in mixed conifer, 182 acres in ponderosa pine/oak, and 20 acres for aspen propagation. The BA provides information about the PACs proposed for thinning treatment, including acres to be treated and general descriptions of the types of treatments proposed (Table 23). The Forest Service also provided us maps of the acres and treatment type proposed for each of the 11 PACs (Appendix B, BA). Aspen thinning would also occur on 27 acres of PAC habitat and 20 acres of core habitat (Table 2). The target basal areas for these aspen treatments is 20 sq ft/acre, which is well below the desired minimum conditions for owl habitat, particularly within the nest core (20 acres is within the Mountain Pine Acres PAC core area).

Target basal area for ponderosa pine stands in MSO PACs are 60-110 sq ft/acre in pine-oak and 100-140 sq ft/acre in mixed conifer. Within nest cores, the target basal areas are 90-130 sq ft/acre in pine-oak and 110-150 sq ft/acre in mixed conifer. Based on modeling conducted by the Forest for mechanical treatments, all of the PACs and cores would be within these ranges immediately after treatments. The BA states that long term, basal area would increase after mechanical treatments with no discernible change in basal area from the effects of prescribed fire. Therefore, the BA states that the basal areas and associated canopy covers for PACs and cores would continue to be within the desired range for both of these habitat components. The Forest Service expects that target basal areas would retain and enhance the canopy cover providing shade and cooler temperatures preferred by MSO in nest/roost stands. However, with the amount of thinning occurring in nest cores (708 acres across nine PACs), it is unclear how canopy cover within these core areas would continue to provide the canopy closure we think is needed to support owl nesting and roosting habitat.

Thinning would also occur in 326 acres of nest/roost replacement habitat and 1,670 acres of recovery habitat. Within recovery habitat, the Forest Service's model projects that treatments would result in movement away from desired conditions identified in the MSO Recovery Plan for both mixed conifer and ponderosa pine-oak for live basal area and percent basal area of trees 12-18 inches dbh through the end of their modeling projection (2057, Table 19 in BA). Trees per acre >18 inches dbh are also projected to be reduced below the desired condition until after 2037 (Table 19 in BA). The BA states that this portion of the modeling is inaccurate due to a higher mortality estimation from prescribed burning than would be anticipated. The Forest thinks this may account for the lack of basal area recovery post-modeled prescribed burn out to 2057. The Forest Service projects that the percent basal area of trees 18 inches dbh and greater would increase over the life of the project to levels that meet and exceed the desired conditions identified in the MSO Recovery Plan (USFWS 2012). The Forest would reduce live tree basal area in PACs and recovery habitat to the levels identified in Table 2, which are below the desired conditions identified in Table C.3 of the MSO Recovery Plan (USFWS 2012). However, within nest/roost replacement recovery habitat, management would focus on maintaining a higher canopy cover of larger trees, while reducing ladder fuels. Some areas within nest/roost replacement habitat and cores would be below desired minimum basal areas identified in the MSO Recovery Plan, though some areas would exceed these levels (Table 2).

Thinning treatments in owl habitat especially within cores and nest/roost replacement habitat has

the potential to result in the loss of important characteristics needed to support owls. These habitat alterations could reduce the availability of nesting and roosting habitat, which is a limiting factor for the owl (USFWS 2012).

Proposed mechanical treatments can also 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 vegetation modification, and soil rutting and compaction using 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 we expect thinning treatments to have effects to owls, 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 in most locations. However, in nest cores, forest thinning may result in the long-term loss of the desired conditions identified in the Mexican spotted owl Recovery Plan, Appendix C (USFWS 2012) and may preclude the use of the areas for nesting and roosting in the long-term if it becomes too open (significantly reduced canopy cover).

Fuel Breaks

The Forest Service would create fuel breaks within approximately 1,054 acres of PAC habitat. This includes 285 acres in mixed conifer and 317 acres in ponderosa pine/oak. Fuel breaks would be up to five chains (330 feet) in width and would include the removal of some large trees and soft snags. These areas would be very open and likely reduce the opportunity for roosting and nesting habitat (since they would remove soft snags and multi-layered canopy from this area). However, these areas should still function as foraging habitat for the owls in PACs, outside of nest cores, and in recovery habitat. However, fuel breaks within nest cores and nest/roost replacement habitat may result in modification that makes these areas unsuitable for nesting and/or roosting. Mexican spotted owls are habitat specialists because of their need for specific habitat components for nesting and roosting. The Recovery Team specifically did not recommend mechanical thinning in core areas because we know so little about how to use forest management to create and/or maintain nest/roost habitat.

The Forest would remove hardwoods, downed woody debris, snags, and other key habitat variables identified in Appendix C of the Recovery Plan (USFWS 2012), where needed to protect life and property. The Forest Service used the minimum desired conditions for nest/roost habitat to measure the effect of target basal areas within PACs, cores, and nest/roost replacement recovery habitat. We would expect that not all portions of a PAC or recovery habitat would meet these desired conditions, but we do expect that reducing existing core areas and potential nest/roost replacement habitat below these guidelines would modify and potentially result in long-term adverse effects to nesting and roosting habitat.

Prescribed Fire

Prescribed fire, the deliberate application of fire to reduce forest fuels, 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 of large trees, hardwoods, snags, and logs during prescribed burning treatments. In the process of applying fire deliberately to this landscape, experience and research have shown that large logs, snags, large trees, and Gambel oaks – all key habitat components of MSO habitat - may be lost or damaged during these activities (Horton and Mannan 1988, Randall-Parker and Miller 2002).

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). They conducted all burns 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:

- Fire consumed or converted to logs twenty-one percent of all snags monitored, and the range of loss across sites was 12 to 38 percent. Fire created nine snags: six of these were live old growth trees and two were Gambel oaks.

- The fire consumed fifty-three percent of all logs monitored (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.

Saab *et al.* (2006), a study conducted as part of the Birds and Burns Network, 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 National Forests. Although few of the results were statistically significant at $p \leq 0.05$, and results included the following:

- Prescribed fire consumed nearly half of large downed wood (≥9 inch large end diameter). The authors surmised that drought conditions, followed by low wood moistures prior to fire treatments, might have contributed to the large loss of downed wood.

- Fire treatments significantly reduced overall tree densities. 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, we expect prescribed burning to reduce the risk of high severity fire by reducing accumulations of fuels, but it would also modify and/or result in the loss of the key habitat components that comprise MSO habitat, both in PAC and recovery habitat. Single and occasional group tree torching could occur during prescribed burns in pine-oak and dry mixed conifer habitats. 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. The Forest would implement design features/conservation measures to minimize these losses, but it is difficult to reduce and protect fuels on the same piece of ground. 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 high levels of coarse woody debris, there is a likelihood that key habitat components would be unintentionally lost to fire and that this could result in short-term adverse effects to owl habitat.

Prescribed fire would not occur within PACs during the breeding season, unless biologists confirm non-breeding through protocol monitoring. This restriction would minimize potential effects to nesting owls, nestlings and recent fledglings from by heat and flames. The Forest Service would strive for low severity fire effects within PACs.

Transportation

Road construction and maintenance, hauling of logs, and road rehabilitation could result in disturbance and habitat effects to individual owls. No new temporary roads would be created to implement treatments in PACs, however approximately 21 miles of new temporary roads would be constructed outside PACs, but may occur within nest/roost replacement recovery habitat. The Forest would also utilize existing system roads, closed system roads, and existing temporary roads. Non-system roads would be decommissioned after access for mechanical treatments is complete.

Since the project would not result in new temporary roads to implement mechanical treatments proposed in PACs, there would be no clearing within PACs to establish temporary roads. The Forest Service would minimize potential effects to habitat by using existing roadbeds 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 one exception. If protocol surveys that year confirm owls are non-nesting, thinning and related activities could occur during the breeding season after coordination with FWS. Because of this condition, we expect that disturbance to breeding owls from these activities would be insignificant.

A major concern regarding direct effects to individual owls from the proposed action 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. The three primary haul routes for this project include the Senator Highway, Big Bug Mesa Road, and the Walker Road (Figure 1). These main haul routes are located within 0.25 mile of seven of the 11 PACs in the project footprint and one of the PACs (Transcendent) within the action area, outside the project area (Figure 1). Furthermore, a PAC makes up only a small portion of an owl's home range and they forage over much larger areas. Potential collisions are a concern at any time of year in the early morning or evening, not just during the breeding season. Trucks could be operating early in the morning or at dusk when owls would be foraging in the action area. Therefore, we assume that there could be an increase in the potential for collisions from project activities compared to normal traffic in the area. With the implementation of a 15 mph speed limit and an estimate of approximately 5-10 loads daily, we do not expect direct mortality of owls to occur due to collisions with logging trucks or vehicles associated with the logging project.

There is a need to create temporary roads, landings, skid trails, and maintenance of existing roads in owl habitats in order to accomplish project treatments. Similar to the effects of 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 would rehabilitate disturbed areas following use, and would use machine piling of logging slash 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.

Disturbance

No treatments would occur within PACs or cores during the breeding season (March 1 through August 31) unless surveys in that year confirm non-nesting. 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. Disturbance of individual, non-breeding owls, may also occur because of chainsaws and other equipment used in fire line preparation. This would result in increased energy expenditure, as well as a potential loss in feeding opportunity and sheltering sites.

Disturbance of owls could occur because of prescribed fire and related activities. Smoke from initial entry and maintenance burning and pile burning may temporarily displace MSO. Smoke may affect adult owls and young outside the 0.25-mile buffer.

Summary of Effects

In summary, the implementation of thinning, fuel breaks, prescribed burning, transportation (hauling and road maintenance), and creation/use of processing sites would result in some short-term adverse and long-term beneficial and adverse effects to MSOs and their habitat. Stand-replacing fire is likely the greatest rangewide threat to the MSO and this project would reduce the risk of high-severity wildfire in this area. However, there is uncertainty regarding the effects of thinning and burning treatments on owls and owl habitat and we do not typically recommended thinning within MSO core areas (USFWS 2012).

- The Forest Service proposes to conduct mechanical and hand thinning within a large percentage of the nest cores (77%), PACs (75%), and nest/roost replacement recovery habitats (91%) within the project boundary. Thinning would also occur on 70 percent (3,296 acres) of foraging/non-breeding recovery habitat. These treatments could result in the loss of important habitat components for owls and reduce the availability of nesting and roosting habitat, which is a limiting factor for MSO. Thinning may change the structure of prey habitat, affecting composition and abundance of prey in the short-term.

- The project would result in fuel breaks in nest cores (19%), PACs (21%), and nest/roost replacement recovery habitat (9%) within the project boundary. Fuel breaks would also occur on 13 percent (640 acres) of foraging/non-breeding recovery habitat in the project area. Fuel breaks would remove hardwoods, downed woody debris, soft snags, and other key habitat variables identified in the Recovery Plan (USFWS 2012). Fuel breaks could result in the long-term loss of key habitat components for MSO habitat in some areas and would reduce the opportunity for roosting and nesting habitat, though these areas may still function for foraging.

- Six PACs would have extensive tree removal (including thinning and fuel breaks). These PACs are: Mountain Pine Acres (83% of PAC, 100% of core), Snowdrift (48% of PAC, 100% of core), Venezia (84% of PAC, 100% of core), Big Bug (85% of PAC, 100% of core), Silver Spruce (89% of PAC, 100% of core), and Towers (83% of PAC, 100% of core). Because we have so little data regarding the effects of thinning in PACs, let alone nest core areas, the Recovery Plan does not recommend mechanical thinning in core areas. We understand that this work is necessary to provide protection to private property and reduce fire risk in this area, but it would likely result in significant adverse effects to owls and their habitat.

- Fire within MSO habitat would consist of mostly low severity fire effects and would aid in increasing forest resiliency and reducing the potential for high-severity fire effects. However, even low severity burns would potentially result in a reduction in snags, downed woody debris, Gambel oak and large trees. All of these are key habitat components of PAC and recovery habitat.

- The Forest would not create temporary roads within PACs. However, there would be short-term effects to key habitat components within recovery habitat from the construction of new temporary roads. The Forest Service would rehabilitate temporary roads following use. Maintenance of existing roads inside PACs and within 0.25-mile for a PAC in the action area would occur outside of the breeding season ,unless protocol surveys that year confirm owls are non-nesting.

- Hauling may occur year-round and would occur within 0.25-mile of eight PACs. Due to the small number of trips per day by hauling trucks, we do not anticipate direct mortality to owls from this activity.

  No activities would occur within PACs from March 1 to August 31 each season unless formal monitoring (to protocol) determines the owls are non-nesting. The Forest Service would confirm survey data with FWS prior to conducting work in PACs during the breeding season.

- This project goal is to reduce the risk of high-severity fire, increase structural and vegetative species diversity, and improve prey species habitat.

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 a proposed action would result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action would 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 would 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, we must consider the functional role of each of the CHUs in recovery 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 the Hassayampa Landscape Restoration Project. We did not analyze the PCEs for steep-walled rocky canyonlands in this BO because this habitat does not occur within the action area. The project proposes to thin, create fuel breaks, and/or conduct prescribed burning in all critical habitat acres (33,740 acres) within the treatment area.

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: We expect that actions implemented under the proposed project would retain the range of tree species (i.e., conifers and hardwoods associated with MSO habitat) currently present on the site, though there may be a shift in the relative abundance of each species. Thinning and fuel breaks would include the removal of trees >12 inches dbh, including trees larger than 18 inches dbh. However, thinning treatments would focus on the removal of smaller trees in order to shift dominance towards larger-diameter trees. The Forest Service designed these actions 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 thinning, fuel breaks, and prescribed fire activities. The Forest Service estimates, within recovery habitat, basal area of trees 12 to 18 inches dbh would remain above the desired conditions through 2037 (Table 19 in the BA). In recovery habitat, basal area in trees greater than 18 inches dbh are expect to increase over time, while the number of trees greater than 18 inches dbh is expected to decrease below current conditions through 2057. Treatments that would 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 would result in long-term benefits to this PCE and owl habitat.

The majority of actions implemented under the Hassayampa Landscape Restoration Project would maintain a range of tree species and sizes needed to maintain this PCE in PACs and recovery habitat across the treatment. However, in some areas, including within PACs and cores, the Forest Service would not be following the Recovery Plan (USFWS 2012) due to the need of reducing the fire risk to adjacent private lands. These treatments would include intensive fuel break construction and mechanical thinning in core areas. Due to potential effects from intensive fuel break construction and thinning, particularly within nest cores adjacent to private lands, treatments in these areas would likely result in long-term reductions to this PCE.

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

Effect: We expect that thinning and burning would reduce tree shade canopy. Where available, the Forest would retain greater than 40 percent canopy cover in protected and nest/roost replacement habitat. Treatments on the remainder of the recovery habitat would have a range of canopy cover, with some areas less than 40 percent. We anticipate that, over time, canopy cover in these areas would increase, as trees grow from reduced competition. Additionally, we would expect that some reduction in existing canopy cover (5 to 10 percent) might actually aid in increasing understory herbaceous vegetation and forb production, which could benefit MSO prey species. Because nest/roost replacement recovery habitat and most PAC habitat would retain canopy closure of 40 percent or more with a goal of developing larger trees, the proposed action would not compromise the function and conservation role of this PCE. In recovery habitat, outside nest/roost replacement habitat, we anticipate short-term reductions in this PCE, with canopy cover increasing over time. Treatments in this area are likely to have long-term benefits to MSO through increased cover from larger trees.

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

Effect: The proposed action would likely both create and result in the loss of large snags following proposed prescribed burning (Horton and Mannan 1988, Randall-Parker and Miller

2002). As prescribed fire kills large and small trees, this would create snags. This may benefit MSOs, 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 MSOs 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). The Forest Service would only remove snags within treatment areas if they pose a hazard to crews on the ground or compromise the effectiveness of the fuel breaks. Therefore, although we anticipate there would be a measurable loss of snags due to implementation of the Hassayampa Landscape Restoration Project, the Forest Service would make efforts to protect this rare resource and minimize this loss; therefore, the proposed action would not compromise the function and conservation role of this PCE.

Primary Constituent Elements related to maintenance of adequate prey species:

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

Effect: The proposed burning treatments (broadcast, piling, and maintenance burning) would reduce downed trees and woody debris 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 PCE and could result in localized effects to prey species habitat. 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. The Prescott Forest Plan recommends maintaining an average of three to 10 tons per acre of coarse woody debris. An excess supply of coarse woody debris can increase the likelihood of high-severity fire within critical habitat. Therefore, some removal of woody debris would result in an overall benefit to the function and conservation role of this PCE. In areas adjacent to private land, where management may significantly reduce this PCE below this guideline, the action is likely to result in long-term negative effects to this PCE.

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

Effect: We expect that the actions taken under the proposed action would positively affect this PCE. Plant species richness would increase following thinning and/or burning treatments that result in small, localized canopy gaps. Short-term reduction of some species could occur during logging operations, prescribed fires, or road construction/maintenance. However, the proposed action would not compromise the function and conservation role of this PCE.

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 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 would likely 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 MSO prey base. The combination of thinning and low-intensity prescribed burns would most likely result in only short-term effects to the MSOs 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). Therefore, the proposed action would not compromise the function and conservation role of this PCE across the project area.

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

We do not expect adverse effects of the proposed action to diminish the conservation contribution of critical habitat to the recovery of the MSO. Designated critical habitat includes all PACs and recovery habitat (unoccupied suitable spotted owl habitat) within the project area. The Hassayampa Landscape Restoration Project includes objectives and species protection measures from the Recovery Plan (USFWS 2012). However, due to the need to protect adjacent private property from fire, the Forest would not be implementing these objectives and protection measures in all areas.

Though we expect this project would result in negative effects to key habitat components and PCEs within Mexican spotted owl critical habitat, we do not expect this project to modify the habitat to the extent that MSO would no longer occupy the entire area. Over the long-term, these actions should increase the sustainability and resiliency of MSO habitat (particularly through fuels management and forest restoration actions). Therefore, we do not expect that implementation of the Hassayampa Landscape Restoration Project would diminish the conservation contribution of critical habitat to the recovery of the MSO.

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. We do not consider future Federal actions that are unrelated to the proposed action 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 near future. Increased and prolonged drought associated with changing climatic patterns would 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 would 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 the Hassayampa Landscape Restoration Project 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 affect 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. We did not designate MSO critical habitat on non-Federal lands; therefore, there are no anticipated cumulative effects to critical habitat from non-Federal actions.

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 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 effects of the proposed federal action and the effects of any interrelated or interdependent activities on the PCEs and how they would 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 would influence the recovery role of affected critical habitat units.

Conclusion

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

- The proposed action would strive to implement the Recovery Plan (USFWS 2012) and manage for Mexican spotted owl recovery within the project area.

- Desired conditions and guidelines in the proposed action 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, CHUs BRW-2 and BRW-3, which treatments would affect, would continue to serve the function and conservation role of critical habitat for the Mexican spotted owl.

We based the conclusions of this biological opinion on full implementation of the project as presented in the Description of the Proposed Action section of this document, including any Conservation Measures the Forest Service 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 analysis of the effects of Forest Service projects within previous forest management BOs, we anticipate the incidental take for actions implemented under the Hassayampa Landscape Restoration Project proposed action will be in the forms of short-term harassment and long-term harm.

Owls experiencing short-term harassment may fail to rear young successfully in one or more breeding seasons, but will not likely desert the area because of a short-term disturbance (Delaney *et al*. 1999); we measure harassment as owls taken associated with a specific number of PACs. We also anticipate incidental take in the form of harm, albeit at a lesser amount than take from harassment and we measure that as the number of owls taken.

There are 11 PACs within the project area and two PACs immediately adjacent to the project footprint and/or haul routes that support owls and may be affected by the proposed action. Fuel breaks and/or thinning will occur in all 11 PACs within the project footprint. Prescribed fire will also occur within these PACs at least twice during the life of the project.

We anticipate long-term harm because of habitat degradation, loss, and alteration that we expect to occur from the extensive fuels reduction treatments proposed in six of the nest cores. Tree removal would result in the loss of important habitat components to support MSO and would reduce the availability roosting and nesting habitat, which is a limiting factor for Mexican spotted owls.

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 Hassayampa Landscape Restoration Project. 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 the Forest Service or other party have yet to implement.

- We anticipate the incidental take 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 because 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 the Hassayampa Landscape Restoration Project is likely to interrupt, impede, or disrupt normal behavior patterns to the point that breeding and feeding activities are affected 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 because of actions associated with this project. As described in the proposed action, the

Forest Service would conduct protocol surveys (formal monitoring) to determine owl-nesting status prior to mechanical and prescribed fire treatments occurring in PACs. If FWS and Forest Service biologists determine that owls in PACs adjacent to mechanical treatments in an areas or within prescribed burn areas are non-nesting or nesting owls are located in an area that is protected from noise disturbance associated with the project (i.e., due to 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 Mexican spotted owls associated with up to six PACs over the 10 year life of the project, in the form of harm due to long-term habitat degradation, loss, and alteration, including the loss/alteration of core habitat resulting in the potential abandonment of PACs. We anticipate this take could occur in the Mountain Pine Acres, Snowdrift, Venezia, Big Bug, Silver Spruce, and Towers PACs and result in the loss of six to 12 owls and their associated future offspring. Although, there is a need for this project to reduce the risk of high severity fire to private property as well as forest resources, given the extent of thinning and fuel break construction within PACs and cores, we anticipate take would occur. We do not anticipate take for the Palace and Lorena PACs due to their existing condition (as described in the BA) indicating that these PACs do not have the vegetative structure needed to support nesting and roosting owls. Though the Grapevine PAC would experience extensive hand thinning, we do not think this would rise to the level of take given that hand thinning would be limited to the removal of small ladder fuels.

The FWS will not refer the incidental take of any migratory bird or bald or golden 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 owl:

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 minimize the effects of the action on owls in the project area.

3. The Forest Service shall ensure that they implement conservation measures and resource protection measures as designed and analyzed. The Forest shall conduct training for all employees and contractors regarding the conservation measures and resource protection measures to ensure that operators implement these measures 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 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. The Forest Service shall track actions implemented both spatially (provide information as to the geographic location of where project activities occurred) and temporally (time over which actions occurred), the survey data forms and summary data for the Mexican spotted owl monitoring, and changes in forest structure post-treatment. The Forest Service and FWS would jointly develop a vegetation/forest structure monitoring protocol that allows us to assess what changes occur to habitat due to project activities. We would collectively develop this protocol by March 2020.

1.2 The Forest Service shall submit annual monitoring reports to the Arizona Ecological Services Field Office (Flagstaff) by January 15 beginning in 2020. This would include the dates the Forest Service or contractors implemented project activities, whether they implemented project activities as analyzed, relevant Mexican spotted owl survey information, and any other pertinent information about the project's effects on individual owls. 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 (928-556-2118) within 24 hours of finding the owl(s).

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

2.1 The Forest shall conduct protocol level surveys throughout the life of the project in the six PACs for which we anticipate long-term habitat effects: Mountain Pine Acres, Snowdrift, Venezia, Big Bug, Silver Spruce, and Towers. These surveys shall include identification and mapping of nest trees. The Forest Service shall protect identified nest trees from any subsequent treatments. In coordination with the FWS, the Forest shall ensure surveys are conducted until such a time that the FWS and Forest Service determine a) owls are absent from the site (minimum of six years protocol surveys post-treatment) or b) that owls are persisting at these sites and we determine collaboratively that surveys are no longer needed.

2.2 The Forest Service shall limit the number of nest core areas thinned, including with hand thinning, mechanical thinning, or fuel breaks, in a given calendar year to two. This would allow the Forest Service and FWS to evaluate core treatments as operators implement them and determine if modifications to treatment prescriptions should occur in order to maintain nest/roost habitat in future core treatments.

2.3 The Forest Service shall work with FWS to ensure that all proposed treatments are coordinated so that there are not multiple entries into PACs and nest cores that may be between different treatment unit boundaries. This would minimize habitat disturbance to owls over time and within individual PACs.

2.4 Development of prescriptions for mechanical treatments and hand thinning in core areas are required to involve FWS and Forest Service biologists. In addition, following implementation of nest core treatments, the Forest Service shall conduct field trips with the FWS to these areas to evaluate the treatment and discuss potential changes to future prescriptions for nest cores.

The following terms and conditions implement reasonable and prudent measure #3:

3.1 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. The FWS worked with other national forests to develop brochures and information to provide employees and contractors and we can provide these examples to the Prescott National Forest for this training. It is an existing requirement for the Forest Service to incorporate relevant conservation measures and resource protection measures into contracts, work orders, and/or agreements. This action works to ensure that employees and contractors understand why the measures exist, which results in better adherence to these measures. This also ensures that the correct contact information and processes to follow if MSO are encountered are provided to forest workers (whether federal or contractors).

3.2 The Forest Service shall 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 Forest Service 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 the Forest Service does not construct new temporary roads within nest/roost replacement recovery habitat.

2. We recommend using LiDar or other remote sensing data to track changes to basal area and canopy cover parameters following treatments, particularly within PAC, core, and nest/roost replacement recovery habitat.

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

REINITIATION NOTICE

This concludes formal consultation for the Hassayampa Landscape Restoration Project. 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.

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 Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hopi Tribe, Hualapai Tribe, Salt River Pima Maricopa Indian Community, Pascua Yaqui Tribe, Yavapai-Apache Nation, Yavapai-Prescott Indian Tribe, and Havasupai Tribe of its completion. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate the Prescott National Forest's efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2019-F-0041 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Rachel Williams (928-556-2050) or Shaula Hedwall (928-556-2118).

Sincerely,

Shaula J. Hedwall
for
Jeffrey A. Humphrey
Field Supervisor

cc (electronic):

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TABLES AND FIGURES

Table 2. Target basal area ranges by location, treatment, and vegetation type.[1]

	Treatment	Location	Basal Area (sq ft/acre)	Acres
Ponderosa Pine/Oak[2]	Thinning	PAC	60-110	1379
		Core	90-130	182
		Nest/Roost Replacement Habitat	90-130	240
		Recovery Habitat	90-110	1508
	Fuel Breaks	PAC	60-80	317
		Core	60-80	33
		Nest/Roost Replacement Habitat	60-80	22
		Recovery Habitat	60-80	251
Dry Mixed Conifer	Thinning	PAC	100-140	398
		Core	110-150	266
		Nest/Roost Replacement Habitat	100-140	86
		Recovery Habitat	80-120	273
	Fuel Breaks	PAC	100-120	285
		Core	100-120	78
		Nest/Roost Replacement Habitat	100-120	10
		Recovery Habitat	100-120	162
Aspen	Thinning	PAC	20	27
		Core	20	20

[1]This table does not include all vegetation types within the project area.
[2]Includes both evergreen and Gambel oak

Table 3. Acres and percentages of MSO PAC and core habitat affected by treatment type

MSO PAC	Total acreage of PAC(core)	Treatments in PACs[1](cores)					
		Fuel breaks		Thinning		Total acres of trees removed[2]	Prescribed fire
		Hand thinning	Mechanical	Hand thinning	Mechanical		
Palace Station	621(69)	0(0)	20(0)	0(0)	532(69)	552(69)	552(69)
Venezia	643(103)	0(0)	0(0)	78(21)	462(82)	540(103)	540(103)
Silver Spruce	617(68)	0(0)	170(10)	0(0)	379(58)	549(68)	549(68)
Mt. Pine Acres	617(101)	0(0)	130(42)	0(0)	384(59)	514(101)	514(101)
Big Bug	679(100)	0(0)	117(15)	4(0)	454(85)	575(100)	579(100)
Grapevine	600(100)	0(0)	17(0)	359(100)	117(0)	493(100)	500(100)
Towers	849(144)	54(17)	360(28)	51(63)	237(36)	702(144)	705(144)
Highland Pines	638(111)	0(0)	0(0)	25(0)	49(0)	74(0)	76(0)
Payoff	619(111)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Lorena Gulch	677(102)	0(0)	85(27)	0(0)	319(12)	404(39)	571(101)
Snowdrift	633(165)	0(0)	93(42)	0(0)	214(122)	307(164)	308(164)
Mt. Tritle	591(224)	0(0)	8(0)	0(0)	0(0)	8(0)	10(0)
Transcendent	626(104)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Total Acres		**54(17)**	**1000(164)**	**517(184)**	**3147(524)**	**4718(888)**	**4904(950)**

[1]Treatments in PACs, but outside of cores.
[2]Summation of fuel breaks and thinning

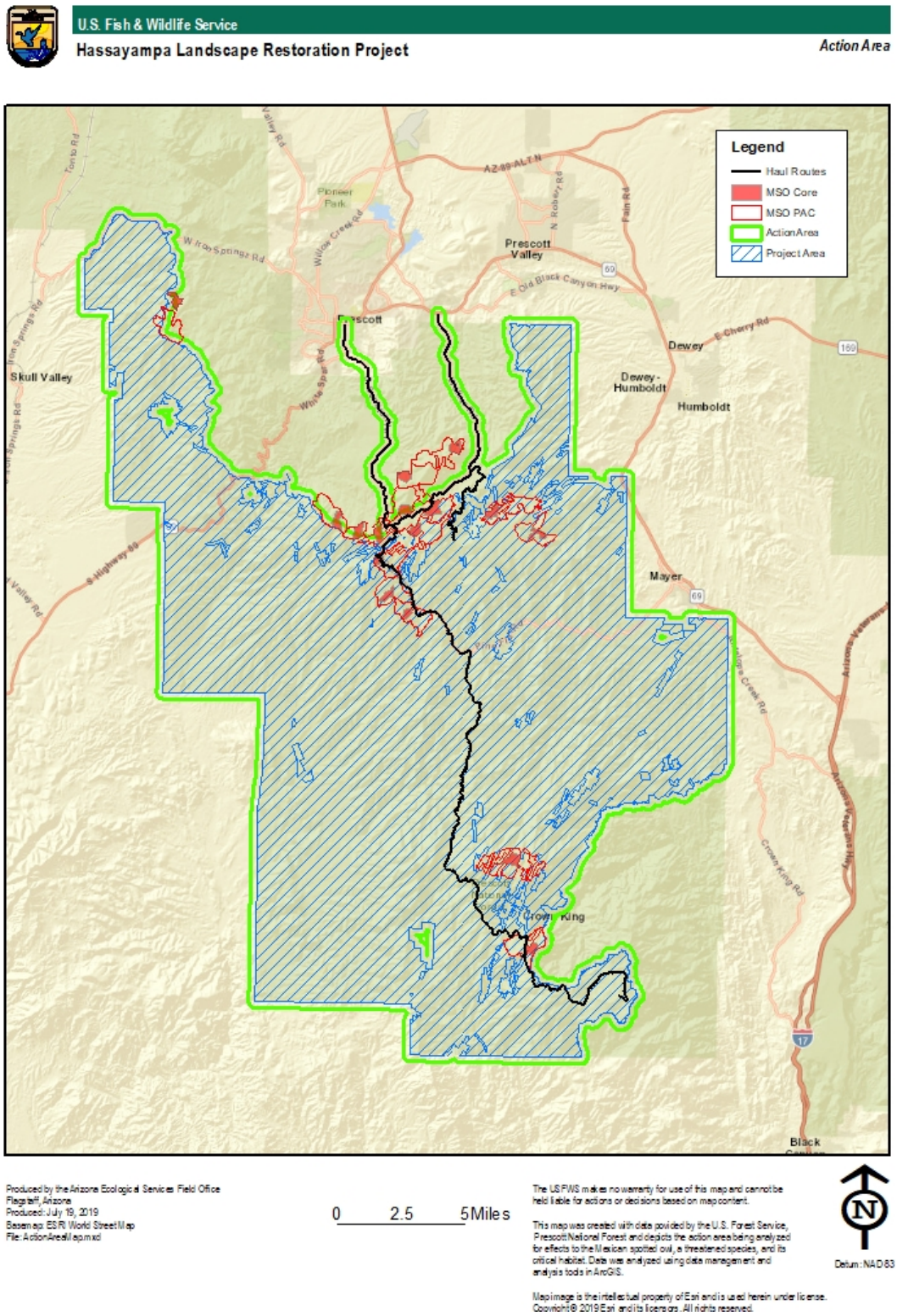

Figure 1. Action area for the Hassayampa Landscape Restoration Project

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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 Gila trout (*Oncorhynchus gilae*).

Gila trout

The Forest Service and Arizona Game and Fish Department introduced Gila trout into Grapevine Creek in 2009. Post-fire effects (e.g., heavy sedimentation) following the Goodwin Fire in 2017 resulted in the extirpation of this species from Grapevine Creek. In April 2019, the Forest Service and the Arizona Game and Fish Department placed fertilized Gila trout eggs into human-constructed redds within Grapevine Creek. A follow-up visit confirmed hatchling fish were present in the creek.

Hand thinning and prescribed burning would occur within the upper Grapevine Creek watershed. The Forest would identify streamside management zones (SMZ) prior to project implementation. A SMZ is an area or strip of land adjacent to a stream or other body of water where the Forest Service plans and implements management practices in a manner that protects water quality, aquatic wildlife and wildlife habitat. Trees and vegetation within the SMZ would serve as a natural filter to keep sediment out of the stream, reduce soil erosion, and buffer the stream from damage caused by nearby management activities such as vegetation treatment and prescribed burning. Activities would still occur within the SMZ, but the Forest Service would manage activities to minimize sedimentation effects to the stream.

The Forest Service would not treat facultative and obligate riparian vegetation within the SMZ. Hand thinning would occur on 77 acres within the SMZ. The Forest Service would design treatments to retain or enhance the riparian vegetation within the SMZ by removing upland species that may be competing with or encroaching upon riparian species. No mechanical treatments would occur within the upper Grapevine Creek watershed (Figure 52 in the BA).

- Ground disturbance during these activities would be minimal and Best Management Practices would minimize sediment input into the stream channels. Any potential effects, such as minor sediment mobilization, are unlikely to occur. No direct fire ignition would occur within the established SMZ. The Forest Service would manage any fire backing into the SMZ for a low burn intensity. Therefore, we expect discountable effects from these actions to Gila trout and their habitat within the Upper Grapevine Creek watershed.

- The proposed actions adjacent to Gila trout habitat would reduce the risk of stand-replacing wildfire, remove upland species that have invaded the riparian area, and enhance native riparian vegetation, all of which should provide long-term water quality improvements and benefit habitat for Gila trout within the action area.