



## United States Department of the Interior

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**In reply refer to:**

AESO/SE  
02EAAZ00-2019-F-0488

June 10, 2020

Mr. Randall M. Walker, District Ranger  
North Kaibab Ranger District  
Kaibab National Forest  
430 South Main  
Fredonia, Arizona 86022

RE: Kaibab Plateau Ecological Restoration Project Biological Opinion

Dear Mr. Walker:

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. *et seq.*), as amended (Act). We received your January 21, 2020, request for consultation, via electronic mail. At issue are the effects of management actions proposed as part of the Kaibab Plateau Ecological Restoration Project within in the North Kaibab Ranger District of the Kaibab National Forest (NF) in Coconino County, Arizona, to the threatened Mexican spotted owl (*Strix occidentalis lucida*, owl) 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 endangered Fickeisen plains cactus (*Pediocactus peeblesianus* ssp. *fickeiseniae*) and its critical habitat. We concur with your determinations and include our rationales in Appendix A.

Additionally, you asked us to concur with your determination that the proposed action is not likely to jeopardize the nonessential experimental population of the California condor (*Gymnogyps californianus*). Appendix B contains this concurrence.

We based this biological opinion on information provided in the January 21, 2020, biological assessment (BA), telephone conversations, meetings, 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 or on other subjects considered in this opinion. A complete record of this consultation is on file at this office.

### **Consultation History**

- July 27, 2018: The Forest Service and FWS met to discuss the project.
- August 2018 – December 2019: The Forest Service and FWS communicated regarding the project and development of the BA.
- December 23, 2019: The Forest Service submitted a BA to FWS.
- December 31, 2019: We emailed the Forest Service our review of the BA and determinations, and requested further discussion.
- January 15, 2020: We emailed the Forest Service to explain why we think the determination for the Mexican spotted owl and critical habitat should be “may affect, likely to adversely affect.”
- January 21, 2020: The Forest Service submitted the Final BA and initiated formal consultation for the Mexican spotted owl and its critical habitat.
- January 27, 2020: We issued a thirty-day letter.
- June 6, 2020: We sent the draft biological opinion to the Forest Service for review.
- June 9, 2020: We received and incorporated your comments into the draft biological opinion.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

Regulations implementing the Act (50 CFR 402.02) define “action” as all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies of the United States or upon the high seas.

A complete description of the proposed action is in your January 21, 2020, BA and other supporting information in the administrative record. We include these documents herein by reference, but provide a summary of the proposed action below.

The purpose of the Kaibab Plateau Ecological Restoration Project (KPERP) is to reduce the threat of uncharacteristic high-severity wildfire and restore fire-resilient conditions to the Kaibab Plateau by conducting fuels reduction treatments on approximately 441,000 acres of the North Kaibab Ranger District. Most of the project area contains frequent-fire forest vegetation (ponderosa pine and dry mixed conifer) that was historically adapted to recurring wildfires. Fire naturally played a vital role in maintaining ecosystem health of most of the vegetation communities. The condition and structure of the forest vegetation in the project area has changed due to decades of successful fire suppression efforts, past forest management practices, and livestock grazing. Today, the project area contains uncharacteristically dense forests with more young trees than were present historically. The increased number and density of young trees can result in high severity fire effects (e.g., complete loss of green forest and pre-settlement trees, and adverse effects to soil). In addition, climate change is increasing the frequency of high-intensity fire in the area due to extended drought, higher ambient temperatures, and reduced winter precipitation.

The project’s goal is to use prescribed fire at a frequency that would improve the landscape’s fire resilience. Managers would implement prescribed fire as broadcast burns and/or pile burning. To meet project objectives, fire managers may have multiple fire entries into a site-specific treatment area with prescribed fire. When managers determine through monitoring that an area has met desired conditions, the use of prescribed fire, with or without mechanical treatments, may continue to maintain desired conditions in the absence of natural ignitions. The Forest Service anticipates the project would take up to 20 years to complete. Managers will base implementation schedules on available funding, the ability to conduct prescribed fires during safe and optimal conditions, and the availability of fire management resources to support prescribed fire.

The Forest Service is proposing approximately 319,000 acres of prescribed fire and approximately 122,000 acres of noncommercial mechanical and hand treatments (collectively referred to as “treatments”). “Noncommercial” means the Forest Service will not sell, trade, or make available wood products for commercial purposes. The Forest Service would make wood products available to tribes for traditional use as directed by the Kaibab Forest Plan. Most mechanical treatments would occur at the same location with prescribed burns. However, the Forest Service may implement some mechanical treatments without prescribed fire, causing the total treatment acreage to be more than 319,000 acres, but not exceed 441,000 acres. Managers

will adjust proposed treatments by implementing resource protection measures (project design elements), based on conditions in each treatment area. In addition, the Forest Service will use adaptive management techniques to monitor and evaluate the effects of fire and thinning treatments and adjust prescriptions and treatment implementation as needed for future treatments to work toward desired conditions.

The project area consists of two proposed treatment zones:

- Zone 1 is composed primarily of ponderosa pine and mixed conifer with aspen, montane/subalpine grasslands above 6,500 feet in elevation.
- Zone 2 is composed of pinyon-juniper sagebrush, pinyon-juniper woodlands, sagebrush shrublands, and semi-desert grasslands, generally below 6,500 feet in elevation.

The Forest Service delineated proposed treatment zones based on existing roads that can serve as holding lines for prescribed fire. There is some overlap of vegetation types between the two zones, and as a result, treatment types, frequency, and scale of treatments will vary between the two zones.

In this biological opinion, we focus the rest of the proposed action discussion on the vegetation types that include Mexican spotted owl recovery and critical habitat. There are three potential natural vegetation types (ponderosa pine, dry mixed conifer, and mesic mixed conifer), three treatment types, and two treatment zones for the project totaling 260,000 acres (Tables 1 and 2).

In the mesic mixed conifer vegetation type, there is limited agreement among stakeholders about treatment intensity and practices. Therefore, initial treatments will include provisions for an experimental design approach and facilitation of multiparty monitoring to increase learning, agreement, and trust. Similar concerns regarding proposed treatments in pinyon-juniper vegetation types warrant a cautious approach. Therefore, in the mesic mixed conifer and pinyon-juniper vegetation types, the Forest Service will implement treatment on a smaller scale with more extensive monitoring of effects as they implement treatments in these vegetation types.

### **Prescribed Fire Implementation**

Prescribed fire implementation could occur any season of the year. Fire managers would base the actual timing on consideration of 21 elements found within each of the site-specific prescribed fire plans that they will develop for this project. Considerations include, but are not limited, to public and fire fighter safety, project objectives, current ecological state, environmental conditions, expected fire behavior, on and off-site values, smoke, forest and visitor uses, and personnel/equipment availability to meet the requirements set forth by the prescribed fire plan.

Fire managers will apply initial entry broadcast prescribed fire applications in the fall, with intermediate, and maintenance entries trending more toward spring and/or summer. Actual timing for conducting burns in a specific area would depend upon the environmental prescription developed to produce the desirable fire behavior to meet objectives for that site. Initial burn

entries would have a “cooler” (lower fire behavior) prescription, while “warmer” (higher fire behavior) prescriptions would be acceptable as treatments progress from intermediate to maintenance. Prescriptions will also vary by ecosystem or fuel type based on the desired conditions for each.

Prescribed fire, supported by mechanical treatments, would be strategically and systematically applied in treatment units across the majority of the ponderosa and mixed conifer vegetation types on the Kaibab Plateau (Zone 1) at an average of 20,000 acres annually. In years with favorable conditions and adequate funding levels, managers could apply prescribed fire on up to 50,000 acres in a year. In other years, treatment areas would be less than 20,000 acres. The Forest Service will monitor fire frequency and burn conditions to insure that fire effects result in desired conditions.

In Zone 1, fire managers would apply broadcast prescribed fire systematically across a series of pre-identified areas supported by mechanical treatments (Figure 2). Each of these areas would then be broken into smaller units, and each year, the Forest Service would treat a number of these smaller implementation units. Fire staff would ignite prescribed fires by personnel on the ground and/or from helicopters.

Fire staff would construct prescribed fire holding lines as needed to protect resources or to hold prescribed fires in predetermined areas. Holding lines include black line, hand line, dozer line, all-terrain vehicle (ATV) draglines, pruning, and saw line (Table 3). Managers will use anchor points or areas that are less likely to burn as holding lines, where possible. This may include existing roads and other features such as trails, creek drainages, meadows, rocky outcrops and other natural barriers. Fire staff would only construct holding lines where natural features, existing roads, or trails do not connect holding features. Managers will approve the location of holding lines based on required survey data and interdisciplinary review. Design elements (see Appendix A, in BA) address conditions for holding lines. After initial use, holding lines would be stabilized and stored (closed to public use) until used for future fire activities necessary to achieve or maintain desired conditions.

The Forest Service will coordinate prescribed burns with the Grand Canyon National Park (GRCA), which abuts the project area. The North Kaibab Ranger District and North Rim GRCA fire programs use a zone concept to manage fire, with common leadership. Together, the agencies routinely manage wildfire and prescribed fires across boundaries. The GRCA and the Forest Service have varying requirements, but they manage prescribed fire across the jurisdictional boundary to avoid holding prescribed fires on the GRCA-Forest Service boundary.

### **Mechanical Treatments**

Mechanical treatments, with no removal of wood products for commercial purposes, would prepare areas for prescribed fire. In addition, managers may use mechanical thinning as a stand-alone treatment where high-intensity or stand-replacing wildfire is not desirable and frequent fire may not be appropriate. Managers could implement mechanical treatments either before or after prescribed fire, or as stand-alone treatments, to reduce conifer densities and fuel levels according

to desired conditions presented in the forest plan. The Forest Service does not intend to use these treatments to promote conditions for regulated timber production.

In inventoried roadless areas, managers may use mechanical treatments to protect fire-sensitive heritage resources. Managers will use only hand tools in inventoried roadless areas.

Mechanical treatments would include pruning ladder fuels, mastication, chipping, thinning, and piling. The proposed action includes two types of mechanical work: use of hand tools only and use of wheeled or track-mounted ground-based machinery. Managers may use machinery such as wheeled or track-mounted masticators, chippers, or clippers except where resource concerns preclude their use. In those areas, managers would use hand tools such as chainsaws, loppers, or handsaws. Design elements (see Appendix A in the BA) address the conditions for use of wheeled or track-mounted machinery.

The Forest Service will use mechanical treatments to remove smaller diameter-at-breast height (dbh) trees with the goal of protecting larger and/or older trees by targeting understory and ladder fuels. However, managers may cut some larger trees to provide safer conditions for the workers or the public, to prevent fire from crossing holding features, or to protect habitat and/or heritage sites.

The Kaibab National Forest will continue to work with tribes to provide wood products and other forest products for traditional use under existing authorities and consistent with achieving the desired conditions in the forest plan

Ponderosa pine is the preferred species to for managers to retain in ponderosa vegetation types. Managers will maintain a mix of tree species in mixed conifer vegetation types, including, but not limited to Douglas fir and ponderosa pine. Forest managers may also promote the retention of aspen and oak.

## **Roads**

The existing network of open and administrative National Forest System (NFS) roads provides access for project implementation and monitoring. The Forest Service will not need or construct any new roads to access the treatment areas for this project. To facilitate project operations, they may need to conduct road maintenance or minor improvements on existing roads. In addition, the Forest Service could temporarily open and improve closed roads for administrative vehicle travel to facilitate project implementation (Table 3). Following treatments, the Forest Service will re-close these roads by constructing rock barricades, earth or log berms, or a combination of any of these near the beginning of a road. They will use materials from on-site, when possible. Managers would maintain functioning drainage structures on these roads prior to closure. The Forest Service would also make efforts to discourage public motorized use of these roads until they are closed. Managers may also temporarily close roads during project implementation for public safety.

## **Hazard Trees and Snags**

The Forest Service would only cut large trees and snags if they pose a risk to personnel or the public or pose a risk of spreading fire across holding lines. Managers may decide to cut hazard trees and snags in treatment units or along roads, developed recreation sites, trails, and other infrastructure as needed for worker or public safety. In addition to being safety hazards, burning snags may fall or produce flying embers that cause fire to cross holding lines, so this may also be a reason managers remove them. For hazard trees and snags cut along roads, fire staff will pile and burn tree limbs and leave the boles for fuelwood gathering.

### **Implementation**

Management activities, as described previously, would align with conditions on the ground at the time of implementation using a combination of field surveys, design elements (Appendix A, in BA), and requirements in prescribed fire plans. Managers would use a geographic information system (GIS) tool to help track where they need additional surveys prior to implementation and where specific design elements apply. Prior to approval, prescribed fire plans and contracts would undergo an interdisciplinary review process conducted by resource specialists to ensure design elements are incorporated appropriately and plans and contracts are within the scope of the environmental analysis. The Kaibab NF and the North Kaibab Ranger District would share project progress, monitoring results, and future implementation plans with the partners, stakeholders, and the public during an annual meeting (this includes the FWS).

### **Monitoring and Adaptive Management**

The Kaibab NF is committed to building a 21st century fire effects monitoring program. Partners and stakeholders would be an integral part of monitoring for this project. In addition to conducting field surveys, collecting plot data, and using remotely sensed information, the Forest Service will also use qualitative field visits to evaluate effectiveness of vegetation treatments and effects to resources. If needed, they will adjust future treatments to address resource concerns and effectiveness of treatments. Although the Forest Service will use monitoring and adaptive management for the duration of the project in all vegetation communities, they will emphasize it in pinyon-juniper vegetation communities and in the mesic mixed-conifer communities where they intend to implement treatments on a smaller scale than those in the ponderosa and frequent fire mixed conifer vegetation types.

Managers will use field surveys, plot data, remotely sensed data, and other resource information to determine if they need to adjust treatment prescriptions to meet desired conditions. Managers will use identified “trigger points” to determine if the project goes beyond or does not reach desired conditions for specific resources. The Forest Plan describes the desired conditions for vegetation communities. The Forest Service and partners will prescribe treatments after reviewing monitoring information. The Forest Service will continually adjust prescriptions to account for changes that result from treatments; natural changes resulting from weather conditions, wildfires, and insects and diseases; and, data from pre-treatment surveys.

### **Conservation Measures**

- Retain coarse woody debris on site to maintain long-term soil productivity (tons/acre ranges depend on vegetation type and Wildland Urban Interface [WUI] designation as described in the forest plan desired conditions). In areas where coarse woody debris levels are deficient, the Forest Service may use lop and scatter to increase coarse woody debris on site. Mangers will consult with a soils or watershed specialist prior to implementing lop and scatter.
- Initial treatment areas in Zone 1 mesic mixed conifer would be monitored by appropriate resource specialists (for example, silviculture, wildlife, forest entomology/pathology, fire/fuels) to evaluate whether treatments are effective for moving toward desired conditions and inform future treatments.
- Initial treatment areas in Zone 1 mesic mixed conifer would be monitored by appropriate resource specialists (for example, silviculture, wildlife, forest entomology/pathology, fire/fuels) to evaluate whether treatments are effective for moving toward desired conditions and inform future treatments.
- In the event surveys or observations detect a Mexican spotted owl nest or roost (or the site otherwise meets the definition of an “owl site” [USFWS 2012]), the Forest Service will work with the FWS to delineate a protected activity center (PAC). The Forest Service would avoid project activities within the PAC unless or until they reinitiated section 7(a)(2)consultation.

### **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 project area is approximately 518,000 acres and encompasses most of the North Kaibab Ranger District of the Kaibab NF within Coconino County, Arizona. The south and southeast project area boundaries are adjacent to Grand Canyon National Park (Figure 1). This consultation covers a period of 20 years.

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

### **Mexican spotted owl**

In 1993, the FWS listed the Mexican spotted owl (hereafter, referred to as Mexican spotted owl, spotted owl, and owl) as threatened under the Act (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) and the Recovery Plan for the Mexican spotted owl, First Revision (Recovery Plan) in December 2012 (USFWS 2012).

### Description and Life History

The Mexican spotted owl is a medium-sized owl without ear tufts. Spotted owls have mottled feathers with irregular white spots on a brown abdomen, back, and head. Mexican spotted owls nest in caves, in stick nest built by other birds, on debris platforms in trees, and in tree cavities. Mexican spotted owls have distinct annual breeding periods, with courtship beginning in March. Owls typically lay eggs in late March or early April, with eggs hatching approximately 30 days later. Nestling owls generally fledge in early to mid-June. A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican spotted owl is found in the Final Rule listing the owl as a threatened species (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.

### Habitat Requirements and Distribution

The spotted owl occurs in forested mountains and canyonlands throughout the southwestern United States and Mexico (Figure B.1 *in* USFWS 2012). The owl ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several states in 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 owl occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Known owl locations in forested habitats indicate that the species has an affinity for older, uneven-aged forests, and the species inhabits a physically diverse landscape in the southwestern United States and Mexico.

In the Recovery Plan (USFWS 2012), the Recovery Team defined specific forest cover types (mixed conifer and pine-oak) and rocky-canyon habitats that provide nesting, roosting, and foraging habitat for Mexican spotted owls (USFWS 2012). The availability of habitat used for nesting/roosting of Mexican spotted owls in forested and rocky-canyon environments limits owl distribution (meaning the nesting and roosting habitat is a limiting factor for spotted owls). Habitat used for nesting/roosting also provides adequate conditions for foraging and dispersal activities. Thus, sustaining nesting/roosting habitat meets other survival and recovery requirements. Based on the specific forest cover type and rocky-canyon definitions, the Recovery Plan (USFWS 2012) focuses management recommendations on two categories of owl habitat: PACs and "recovery habitat" (the Recovery Team previously called recovery habitat "restricted habitat" in the 1995 Recovery Plan; the terms are synonymous).

PACs are intended to sustain and enhance areas that are presently, recently, or historically occupied by breeding Mexican spotted owls (USFWS 2012). Minimum PAC area is 600 acres and is based on the median size of the adaptive kernel contour enclosing 75% of the foraging locations for 14 pairs of radio-marked owls (595 ac) (Ganey and Dick 1995). Thus, PACS protect activity centers used by owls rather than entire home ranges. Consequently, there is no upper limit for PAC sizes; managers may create larger PACs if appropriate. The FWS and land managers establish PACs around owl sites (as defined in the Recovery Plan). All PACS should contain a designated 100-acre nest/roost core area, designed to offer additional protection to the

nest or primary roost areas. The Recovery Plan (USFWS 2012) emphasizes protection of habitat used for nesting and roosting within PACs because the owls are most selective for such habitat (Ganey and Dick 1995, USFWS 2012 [Appendix B]) and these forest conditions are most limited across the landscape. These areas also provide resources to meet other life-history needs of the owl. Therefore, designating PACs protects and maintains occupied owl habitat.

Recovery habitat occurs in forest types and rocky canyons used by owls for roosting, foraging, dispersal and other life history needs; however, recovery habitat occurs outside of PACs. Recovery habitat is intended to: 1) provide protection for areas that may be used by owls; 2) foster creation of nest/roost habitat; 3) simultaneously provide managers with greater management flexibility than is allowed in PACs; and, 4) facilitate development and testing of management strategies that could be applied in PACs (USFWS 2012). Areas not classified as either PACs or recovery habitats, are classified as “Other Forest and Woodland Types” and “Other Riparian Forest Types” (USFWS 2012). These areas, which nesting owls rarely use, but owls may use for foraging and dispersal, generally include pure ponderosa pine forest, pinyon-juniper woodland, or other habitat types. Given their relatively limited importance to nesting owls, the Recovery Plan (USFWS 2012) contains no owl-specific recommendations in “Other Forest and Woodland Types” and “Other Riparian Forest Types”.

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 (USFWS 2012), we renamed RUs as “Ecological Management Units” (EMUs) to be in accord with current FWS guidelines. The Recovery Team divided the owl’s range within the United States into five EMUs: Colorado Plateau (CP), Southern Rocky Mountains (SRM), Upper Gila Mountains (UGM), Basin and Range-West (BRW), and Basin and Range-East (BRE) (USFWS 2012). 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.

### Threats

We cited two primary reasons for the original listing of the Mexican spotted owl in 1993: (1) the historical alteration of its habitat as the result of timber-management practices; and, (2) the threat of these practices continuing. 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), the FWS and Recovery Team acquired new information on the biology, threats, and habitat needs of the owl. Threats to its population in the U.S. (but likely not in Mexico) have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire (USFWS 2012). Recent forest management has moved away from a commodity focus, such as commercial-based timber harvest, 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.

Southwestern forests have experienced larger and more severe wildland fires from 1995 to the present, than prior to 1995 (Westerling 2016). Climate variability combined with unhealthy forest conditions (i.e., too many trees; high levels of insects and disease; excessive fuel loads; etc.) also synergistically result in increased negative effects to habitat from fire (Fulé *et al.* 2004, Littell *et al.* 2009). 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 (Jones *et al.* 2016, Ganey *et al.* 2017). Currently, high-severity, stand-replacing fires are influencing the persistence of ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Wildland fire is likely the greatest threat to the Mexican spotted owl within the action area and fire severity and size have been increasing (USFWS 2012). 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 owl's range. Although owls will forage in severely burned areas, habitat is often lacking for nesting and roosting in these areas, particularly when high severity fire affects large patches of habitat (Jones *et al.* 2016).

Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to owls through habitat modification and disturbance. As the human population grows in the southwestern United States, small communities within and adjacent to wildlands are being developed. This trend may have detrimental effects to spotted owls by further fragmenting habitat and increasing disturbance during the breeding season.

Global climate variability may also be a threat to the owl. Changing climate conditions may interact with fire, management actions, and other factors discussed above, to increase 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, and Mueller *et al.* 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, and to invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

Historical and current anthropogenic uses of Mexican spotted owl habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (*e.g.*, timber, oil, gas), and development. These activities have the potential to reduce the quality of owl nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout the range of the owl and can have an adverse 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 Mexican spotted owl, including predation, starvation, accidents, disease, and parasites. For example, West Nile Virus also has the potential to effect the owl. We have not documented the virus in spotted owls in Arizona, New Mexico, and Colorado, but 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 birds that we have banded, we will most likely not know when owls contract the disease or the extent of its effect to the owl range-wide.

### Population Status and Process of Delisting

The recovery objective stated in the Recovery Plan (USFWS 2012) is “to support the Mexican spotted owl throughout its range into the foreseeable future, and to maintain the habitat conditions necessary to provide roosting and nesting habitat for the Mexican spotted owl.” In addition, the FWS and Recovery Team developed two recovery (or delisting) criteria (addressing listing factors A, C, and E) that we must meet before the owl can be delisted. These criteria are:

1. Owl occupancy rates must show a stable or increasing trend after 10 years of monitoring.
2. Indicators of habitat conditions (key habitat variables) are stable or improving for 10 years in roosting and nesting habitat.

Once the FWS can show that we have met these two criteria across the range of the owl, the FWS would then review the regulations and known distribution (the spatial arrangement across its range) of Mexican spotted owls to determine if the delisting process should proceed. At this time, we cannot describe the future desired distribution of owls across their range because changes in the species’ range may occur due to factors such as climate change, which could result in shifts in the owl population to the northern portion of its range. In addition to meeting the delisting criteria, to delist the Mexican spotted owl, the FWS must be able to demonstrate, using the best scientific information, that Federal, state, and tribal land managers have moderated and/or regulated anthropogenic and non-anthropogenic threats to the Mexican spotted owl (USFWS 2012). We derive the best scientific information from research, management experiments, and monitoring conducted at the appropriate scales and intensity. The FWS must also conduct an analysis of the five listing factors to verify that threat levels are acceptable for likely persistence of owl populations into the future.

In the Recovery Plan (USFWS 2012), the Recovery Team identified two types of monitoring recommended for the Mexican spotted owl. The first is surveying for individual owls by using the FWS Mexican spotted owl survey protocol (USFWS 2012 [Appendix D]). These are surveys conducted to locate individual owls (this information allows FWS and land managers to designate PACs) and to monitor the status of owls associated with known PACs (to locate nests and roosts, and determine their reproductive status in a given year). Mexican spotted owl 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 owl 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 NFs in New Mexico). Thus, we cannot infer an increase in abundance in the species range-wide from these data (USFWS 2012). However, the Recovery Team and FWS do assume that an increase in the number of occupied sites is a positive indicator regarding owl abundance.

In addition to this survey protocol for individual owls, the Recovery Team also developed and recommended a methodology for conducting Mexican spotted owl population monitoring, using an occupancy (presence/absence) model to determine the population trend (stable, increasing, decreasing) of owls range-wide (USFWS 2012 [Appendix E]). We are currently working with the Southwestern Region of the Forest Service to conduct the population monitoring recommended in the Recovery Plan (USFWS 2012 [Appendix E]) on NFS lands in Arizona and New Mexico. The effort to conduct this work has occurred during the 2014-2019 breeding seasons (six years). The Recovery Team, Forest Service, FWS, and the Bird Conservancy of the Rockies (BCR, contractor) are continuing to collect data on NFS lands. There are approximately 200 quadrats sampled each year on NFS lands in Arizona and New Mexico. We are developing a strategy for incorporating additional lands (*e.g.*, National Park Service, Bureau of Land Management, and Department of Defense) into the monitoring. It is important to state that delisting criteria in the Recovery Plan (USFWS 2012) require that monitoring occur across the range of the owl, not just across an individual land management entity (*e.g.*, must include lands managed by all entities, *i.e.*, not just NFS lands). Currently, based on the work conducted by the Forest Service and BCR, we have further developed the process for conducting rangewide population monitoring as described in Appendix E of the Recovery Plan (USFWS 2012).

It is important to note that the entire range of Mexican spotted owls covers area in five U.S. states (Arizona, Colorado, New Mexico, Texas, and Utah) and a large area of Mexico. Within the United States, Region 3 (Southwestern) NFS lands are located in Arizona and New Mexico, which is only a portion of the range of the Mexican spotted owl. Occupancy monitoring conducted on NFs in Region 3 alone may not allow the FWS to meet rangewide-delisting criteria, but it will allow the FWS and Forest Service to assess population trends on Region 3 NFS lands in Arizona and New Mexico. The spatial scale at which this monitoring is occurring allows for interpretation of owl population trends for all Region 3 NFS lands. However, we (BCR, the Forest Service and the FWS) did not design the current NFS occupancy sampling scheme to scale down to monitor owl occupancy trends on any individual NF within the Southwestern Region. We did not design it to meet this smaller scale objective because the objective is to develop a trend for all NFS lands in Region 3, not for each individual forest.

### **Mexican spotted owl Critical Habitat**

The FWS designated critical habitat for the Mexican spotted owl in 2004 on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (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). We determined the primary constituent elements (PCEs) for owl critical habitat 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 habitat types.

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 diameter at breast height (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.

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

- Presence of water (often providing cooler and often higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, piñon-juniper, and/or riparian vegetation;

- Canyon walls containing crevices, ledges, or caves; and,
- High percent of ground litter and woody debris.

### **Mexican spotted owl and Critical Habitat status summary**

Overall, the status of the Mexican spotted owl and its designated critical habitat has not changed significantly since listing range-wide in the U.S. (which includes Utah, Colorado, Arizona, New Mexico, and extreme southwestern Texas). This means the distribution of owls continues to cover the same area, and critical habitat is continuing to provide for the life history needs of the Mexican spotted owl throughout all of the EMUs located in the U.S. We know this because project-level surveys continue to find Mexican spotted owls in the same locations across the range of the owl, and we continue to conduct section 7 consultations on federal agency actions and receive section 10(a)(1)(b) recovery reports that provide rangewide updates regarding owl and habitat status. We do not have detailed information regarding the status of the owl in Mexico, so we cannot make inferences regarding its overall status.

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

### 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 in Arizona is located on our Arizona Ecological Services Office [website](#).

### **ENVIRONMENTAL BASELINE**

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of all proposed Federal projects in the action that have already undergone formal or early section 7 consultation, and the effect of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

**Status of the species (including its habitat) and critical habitat within the action area**

The action area is located in the Mexican spotted owl CP EMU (USFWS 2012). Although there have been some spotted owl detections on the Kaibab Plateau, follow-up surveys have not located owls, so there are no known Mexican spotted owls or designated PACs within the action area. Mexican spotted owls primarily utilize canyon habitat in GRCA to the south of the North Kaibab Ranger District (Bowden *et al.* 2015) and in southern Utah to the north of the ranger district (Rinkevich and Gutiérrez 1996; Willey and Van Riper 2007). Bowden *et al.* (2015) found that most Mexican spotted owl detections that occurred outside of canyon habitat were within 0.5 mile of the rim of the Grand Canyon. The Forest Service also conducted 30 years of surveys with no detections. Additionally, BCOR for the last six years conducted occupancy surveys at nine quadrats on the North Kaibab Ranger District and did not detect any spotted owls. Based upon this information, we do not think that there are resident owls within the project area at this time and we will not consider effects to individual owls from the proposed action in this biological opinion.

*Recovery Habitat*

The Kaibab NF developed a model to identify forest stands that meet the definition of mixed conifer forest as defined in the Recovery Plan (USFWS 2012). Based on stand verification, the Forest Service identified 54,617 acres of recovery habitat, district-wide. The Forest Service classified 13,709 acres (25%) as recovery nest/roost replacement habitat based on an examination of habitat conditions, and as recommended within the Recovery Plan (USFWS 2012).

*Critical habitat*

Mexican spotted owl critical habitat unit CP-10 is located in northwestern Arizona, and is predominantly within the boundaries of the Kaibab NF and GRCA National Park. The majority of this unit contains steep-walled canyon habitat, but the unit also contains forested habitat within the North Kaibab Ranger District and GRCA. The North Kaibab Ranger District contains approximately 231,572 acres of Mexican spotted owl critical habitat, and of that, approximately 173,000 acres (75 percent) overlap the KPERP area, with about 170,000 acres in treatment Zone 1 and 3,000 acres in treatment Zone 2.

**Factors affecting the species (recovery habitat) and critical habitat within the action area**

Factors affecting recovery and critical habitat within the KPERP action area include high-intensity wildfire and forest management (thinning and prescribed burning actions). The 2006 Warm Fire removed approximately 7,123 acres of mixed conifer recovery and critical habitat. This area is unlikely to support mixed conifer forest over the next 100-150 years due to extended drought and increased temperatures.

In 2019, the Castle and Ike's wildfires, which were naturally (lightning) ignited fires and managed for resource benefit, burned within mixed conifer recovery and critical habitat. The fire perimeters included approximately 11% of the identified nesting/roosting recovery habitat and

7% of the identified recovery habitat on the district. The majority of recovery habitats either did not burn or burned at low severity. Less than 0.1 percent of the recovery habitat burned at moderate intensity and none of the recovery habitat burned at high intensity. Under the appropriate conditions, fire managers on the Kaibab Plateau have demonstrated they are able to manage for lower severity fire effects in the dry and mesic mixed conifer forest.

## **EFFECTS OF THE ACTION**

In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that the proposed action causes, including the consequences of all other activities that are caused by the proposed action. The proposed action causes a consequence if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see §402.17).

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

As stated above, there are no owl sites (occupied areas or PACs) within the action area. Therefore, there will be no effects to individual Mexican spotted owls. However, there are 54,617 acres of recovery habitat within the action area and there will be short-term adverse effects to key habitat components, as explained above.

#### *Mechanical Thinning*

Up to roughly 60% of Mexican spotted owl recovery habitat, and 100% of nest/roost recovery habitat on the district, are within the potential mechanical treatment area, but it is unlikely that all mixed conifer treatments would occur in recovery habitat or nest/roost recovery habitat. A maximum of about 30,000 acres of mechanical treatments (by machine and hand) would occur in the mixed conifer PNVTs. Mechanical treatments would generally retain existing forest structure because mechanical treatments would focus removal on smaller trees with the goal of protecting larger or older trees by targeting understory and ladder fuels. The goal is to retain larger trees, and to retain higher levels of canopy cover and coarse woody debris in nest/roost recovery habitat.

#### *Prescribed Fire*

Effects from prescribed burning to the key habitat components of recovery habitat and the PCEs of critical habitat are difficult to quantify due to the uncertainty inherent in prescribed fire. Prescribed fire could occur anywhere within Mexican spotted owl recovery habitat, including nesting/roosting recovery habitat. The Forest Service is implementing project design features to minimize the loss or modification of large trees, snags, and logs during all prescribed burning treatments. However, one of the stated goals of the KPERP project is to reduce the risk of high-severity crown fire in recovery and critical habitat by treating both inside and outside of Mexican spotted owl habitat over the life of the project. In the process of applying fire deliberately to the landscape, experience and research have shown that large logs, snags, large trees, and hardwoods – all key habitat components of Mexican spotted owl habitat and PCEs of critical habitat - may

be lost as a result (e.g., Horton and Mannan 1988, Randall-Parker and Miller 2002). We support the Forest Service's efforts to sustain fire as a fundamental ecological process within the action area and support this as the best management option for maintaining forest cover, and specifically owl habitat, on the Kaibab Plateau. However, we also know that fire is not a precision tool and that adverse effects will occur to key recovery habitat components and critical habitat PCEs (see critical habitat analysis below).

Owl habitat within KPERP is occurs in the dry and mesic mixed conifer. However, most of our data for effects to key habitat components is from ponderosa pine forest. Because frequent fire dry mixed conifer forest is similar to ponderosa pine, prescribed fire effects are likely to be similar. In mesic mixed conifer forest we would expect increased effects to large logs, snags, and potentially large trees, due to its inherent character of having (typically) heavier fuel loads, increased number of trees per acre, and tendency to have more continuous canopy (which may allow for more torching of trees during fire operations). However, the prescribed fire's effects to mesic mixed conifer habitat may be reduced because this forest type is often less available for burning. Moisture levels within the fuels is typically such that it must be very dry for it to be receptive to burning (hence the term "mesic"). It is our understanding that the Forest Service does not intend to burn adjacent to these areas when conditions would allow for extreme fire behavior; therefore, effects would be moderated and fire creeps within, but does not consume the mesic mixed conifer stands.

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). Managers 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 21% of all snags monitored and the range of loss across sites was 12 to 38%. Fire created (killed trees) nine snags: of these, six were old growth trees that fire converted from live to dead trees and two were Gambel oaks.
- Fire consumed 53% of all logs monitored. Log loss did not differ by tree species.
- Six percent of the 282 Gambel oaks greater than 10 inches dbh were lost, and loss ranged from 0 to 9 percent across the five sites.
- Old growth tree loss across the sites ranged from zero to six percent.

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

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

The Coconino NF's monitoring data (FWS files) from previously implemented prescribed burns in ponderosa pine forest also has shown losses of key habitat components. Microhabitat monitoring results from prescribed burns on the Happy Jack Urban Interface Project through late 2004 measured an 8% loss of trees greater than 18 inches dbh, a 21% loss of snags (based on a pre-treatment count), a 71% loss of logs, and a 47% loss of Gambel oak trees greater than 5 inches dbh. In addition, prescribed burns conducted along Highway 87 and Forest Highway 3 (2005-2006) appear to have had loss of canopy cover and basal area. These areas did not include PAC habitat, but they did include owl recovery and critical habitat, so the results are applicable to this discussion (although KPERP includes mixed conifer owl habitat where effects may be greater than what we noted above due to higher fuel loads).

Based upon the results from these studies and monitoring, we expect prescribed burning to reduce fuel accumulation and the risk of high-intensity wildfire, but it will also modify and/or result in the loss of some key Mexican spotted owl recovery habitat components. Fire managers will implement design features/conservation measures in an attempt to minimize these losses, but it is difficult to reduce and protect fuels on the same piece of ground. We think that fire staff involved in implementing the project are experienced and will use best management practices to achieve low severity fire effects. However, based upon the number of acres proposed for burning each year, the fuel/vegetation type (mixed conifer) and the need for multiple entries over the life of the project, there is a likelihood that key habitat components will be unintentionally lost to fire and that this could result in short-term adverse effects to Mexican spotted owl recovery 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 will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely affect 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 KPERP. We did not analyze the PCEs for steep-walled rocky canyonlands in this biological opinion because this habitat does not occur within the proposed action area. There are 231,572 acres of Mexican spotted owl designated critical habitat on the North Kaibab Ranger District. Approximately 173,000 acres (75 percent) overlap the project area, with about 170,000 acres in Treatment Zone 1 and 3,000 acres in Zone 2. Of this, approximately 54,617 acres are recovery habitat (per USFWS 2004, 2012) and therefore, designated critical habitat.

*Primary Constituent Elements and effects 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 the proposed project would retain the range of tree species (i.e., conifers and hardwoods associated with owl habitat) currently present on the site, though there may be a shift in the relative abundance of each species. The Forest Service will use mechanical treatments to remove small diameter trees with the goal of protecting larger and/or older trees from prescribed fire by targeting understory and ladder fuels. Managers may cut some larger trees to provide safer conditions for the workers or the public, to prevent fire from crossing holding features, or to protect habitat and/or heritage sites. However, mechanical thinning treatments in KPERP would focus on the removal of smaller trees in order to support conducting prescribed fire and should not affect the overall range of large trees in critical habitat. The focus on small diameter tree removal and the overall goal of restoring fire as an ecological process in the action area would result in long-term benefits to this PCE and owl habitat by altering forest structure and/or composition to reduce the risk of severe wildfire, thereby assisting with the maintenance of forest canopy and large tree retention.

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

*Effect:* We expect that prescribed burning would reduce tree shade canopy, because this is an objective of the proposed action. 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%) might actually aid in increasing understory herbaceous vegetation and forb production, which could benefit spotted owl prey species. Because nest/roost replacement recovery 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 reductions in this PCE, with canopy cover increasing over time. Treatments in this area may also have long-term benefits to the area through increased cover from larger trees. The Forest Service's monitoring plan (to be developed with stakeholders, including FWS) will provide important information on the effects of KPERP on canopy cover with the proposed mechanical thinning and increased prescribed fire, and the effectiveness of the design features included in the proposed action.

*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  $\leq 9$  inches dbh (Saab *et al.* 2006). Snags used by Mexican spotted owls for nesting are typically very old, large dbh, highly decayed snags with cavities. Snags with these characteristics tend to be limited in ponderosa pine and mixed-conifer forests in northern Arizona (Ganey and Vojta 2004). The Forest Service would only cut snags if they pose a risk to personnel or the public or pose a risk of spreading fire across holding lines (*i.e.*, removal of hazard trees and snags in treatment units or along roads). We anticipate there would be a measurable loss of snags due to implementation of KPERP, although 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.

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

*Effect:* We expect that 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 prescribed fires. In Zone 1 (which includes most of the critical habitat), fire managers would broadcast prescribed fire systematically across a series of pre-identified areas that are prepared for fire by using mechanical treatments to remove ladder fuels (Figure 2). Each of these areas would then be broken into smaller units, and each year, the Forest Service would treat a number of these smaller implementation units. This would spread the annual application of broadcast prescribed

fire across different portions of Zone 1, creating a mosaic of conditions, and further reducing the potential for larger, higher intensity wildfire prior to managers implementing initial treatments in other areas. It is our opinion that 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 use of prescribed fire in recovery habitat will likely increase herbaceous plant species diversity (Jameson 1967, Moore *et al.* 1999, Springer *et al.* 2001) and, in turn, assists in the production and maintenance of the owl prey base. The combination of thinning and low-intensity prescribed burns would most likely result in only short-term (one to two growing seasons) effects to this PCE 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 Mexican spotted owl. Designated critical habitat includes all recovery habitat (unoccupied suitable spotted owl habitat) within the project area. The KPERP includes objectives and species protection measures from the Recovery Plan (USFWS 2012).

Though we expect KPERP would result in measurable adverse effects to PCEs within Mexican spotted owl critical habitat, we do not expect this project to modify the habitat to the extent that we would no longer consider it suitable recovery habitat. Over the long-term, these actions should increase the sustainability and resiliency of ponderosa pine, dry and mesic mixed conifer through the reintroduction of fire to the project area. Therefore, we do not expect that implementation of KPERP would diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl.

## **CUMULATIVE EFFECTS**

Cumulative effects are those effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the action area considered in this biological opinion (50 CFR 402.02).

Climate change, in combination with drought cycles, is likely to exacerbate existing threats Mexican spotted owl forest habitat in the southwestern U.S., now and into the near future (USFWS 2012). Increased and prolonged drought associated with changing climatic patterns

will adversely affect forests through increased drought, increased ambient temperatures, and reduced winter precipitation, which is likely to result in the death of large and smaller diameter trees, an increase in abiotic and biotic forest stressors (e.g., bark beetles, drought stress), and even vegetation type conversion. The continued warming and drying of forested habitats will likely alter vegetation structure and composition and reduce the amount and quality of nesting and roosting habitat for Mexican spotted owls in the action area. Currently, the use prescribed fire and mechanical treatments to manipulate structure and fuels, is likely the most important tactic we have available to sustain fire as ecological process in frequent-fire adapted forests and attempt to increase their resilience to climate-induced stressors. Because most of these actions occur on federally managed lands, we expect that most activities that may affect owls, we will evaluate under section 7(a)(2) of the ESA.

## **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 effects 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 will influence the recovery role of affected critical habitat units; and,
- (4) Cumulative Effects, which evaluate the effects of future, non-federal activities in the action area on the PCEs and how they will influence the recovery role of affected critical habitat units.

### **Conclusion**

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

We base this conclusion on the following:

- There are currently no known occupied owls sites (PACs) within the KPERP action area. Therefore, the project will not adversely affect individual owls. However, implementation of this project will assist the existing forest habitat with climate adaptation and is likely an important step towards maintaining forest cover on the Kaibab Plateau as climate change effects increase.

- Within the action area, the Forest Service is managing for nest/roost replacement recovery habitat within the dry and mesic mixed-conifer forest. Nesting and roosting habitat is a limiting factor for the owl throughout its range. By managing for lower severity fire and reducing the potential for landscape level high-severity fire, the Forest Service will enhance and protect the key habitat components of recovery nest/roost habitat, recovery foraging/dispersal habitat, and the PCEs of critical habitat. In addition, the Forest Service's project implementation will maintain the existing recovery habitat for foraging, dispersal, and wintering owls.
- Based on the discussion provided in the Effects and Cumulative Effects sections above, the proposed action will aid in the ability of CHU CP-10 to 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.

## **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. We define "incidental take" 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.

### **AMOUNT OR EXTENT OF TAKE**

The FWS does not anticipate the proposed action will incidentally take any Mexican spotted owls because current survey and occupancy data indicate that there are no breeding Mexican spotted owls within the KPERP action area.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Forest Service work with FWS to monitor the effects of KPERP on the dry and mesic mixed conifer vegetation.

### REINITIATION NOTICE

This concludes formal consultation for the Kaibab Plateau Ecosystem 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 project exceeds the amount or extent of incidental take, any operations causing such take must cease pending reinitiation.

In keeping with our trust responsibilities to American Indian Tribes, we encourage you to coordinate with the Bureau of Indian Affairs in the implementation of this consultation. By copy of this biological opinion, are notifying the Fort Mojave Indian Tribe, Hopi Tribe, Hualapai Tribe, Havasupai Tribe, Navajo Nation, and Zuni 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 Kaibab NF's efforts to identify and minimize effects to listed species from this project. We also appreciate your efforts to include us in the development, and implementation of this project.

Please refer to the consultation number, 02EAAZ00-2019-F-0488 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Shaula Hedwall (shaula\_hedwall@fws.gov).

Sincerely,



Jeffrey A. Humphrey  
Field Supervisor

cc (electronic):

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ  
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ  
Fish and Wildlife Biologists, U.S. Fish and Wildlife Service (Attn: Brian Wooldridge, Kathy Robertson)  
Stewardship Staff, Kaibab National Forest, Williams, AZ (Attn: Mike Hanneman)

District Wildlife Biologist, Kaibab National Forest, Fredonia, AZ (Attn: Todd Russell)  
Forest Fuels Specialist, Kaibab National Forest, Fredonia, AZ (Attn: Drew Leiendecker)  
Director, Cultural Resource Center, Chemehuevi Tribe, Havasu Lake, CA  
Director, Tribal Historic Preservation Office, Colorado River Indian Tribes, Parker, AZ  
Tribal Secretary, Havasupai Tribe, Supai, AZ  
Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ  
Director, Cultural Resources, Kaibab Band of Paiute Indians, Fredonia, AZ  
Environmental Protection Officer, Environmental Quality Services, Western Regional  
Office, Bureau of Indian Affairs, Phoenix, AZ

### TABLES AND FIGURES

**Table 1.** Maximum acres of each treatment type by Potential Natural Vegetation Type (PNVT) and Treatment Zone that contains Mexican spotted owl habitat and critical habitat.

PNVT Type	Project Area Acres	Zone 1				Zone 2			
		PNVT (acres)	Rx Fire	Thinning (Machinery)	Thinning (Hand Tools)	PNVT acres	Rx Fire	Thinning (Machinery)	Thinning (Hand Tools)
<b>Ponderosa Pine</b>	127,103	120,970	120,970	25,000	6,000	6,133	6,133	3,700	300
<b>Frequent Fire Mixed Conifer</b>	105,442	104,265	104,265	20,000	5,000	6,177	6,177	900	100
<b>Mesic Mixed Conifer</b>	27,479	27,441	27,441	3,000	1,500	38	38	29	38
<b>Total Acres</b>	260,024	252,676	252,676	48,000	12,500	12,348	12,348	4,629	438

**Table 2.** Summary of Treatment Acres by Potential Natural Vegetation Type (PNVT)

PNVT Type	Total Project PNVT Acres	Prescribed Fire	Mechanical (Machinery)	Mechanical (Hand Tools Only)
<b>Ponderosa Pine</b>	127,103	127,103	28,700	6,500
<b>Frequent Fire Mixed Conifer</b>	105,442	105,442	20,900	5,100
<b>Mesic Mixed Conifer</b>	27,479	27,479	3,027	1,538
<b>Total Acres</b>	260,024	260,024	52,627	13,138

**Table 3.** Holding Line Tools, Maximum Acres of New Disturbance, and Use of Existing Closed Roads and Existing Dozer Lines by Potential Natural Vegetation Type (PNVT)

<b>PNVT Type</b>	<b>Dozer Line</b>	<b>ATV Drag Line</b>	<b>Hand Line</b>	<b>Maximum New Disturbance* (acres)</b>	<b>Maximum Use of Existing Closed Roads and Existing Dozer Line* (acres)</b>
<b>Ponderosa Pine</b>	Yes	Yes	Yes	44.8	87.3
<b>Frequent Fire Mixed Conifer</b>	Yes	Yes	Yes	38.8	81.2
<b>Mesic Mixed Conifer</b>	Yes	Yes	Yes	19.4	12.1
<b>Total Acres</b>				103	180.6

\*Acres determined based on 2-foot wide hand line, 4-foot wide ATV dragline, and 10-foot wide dozer line and roads.

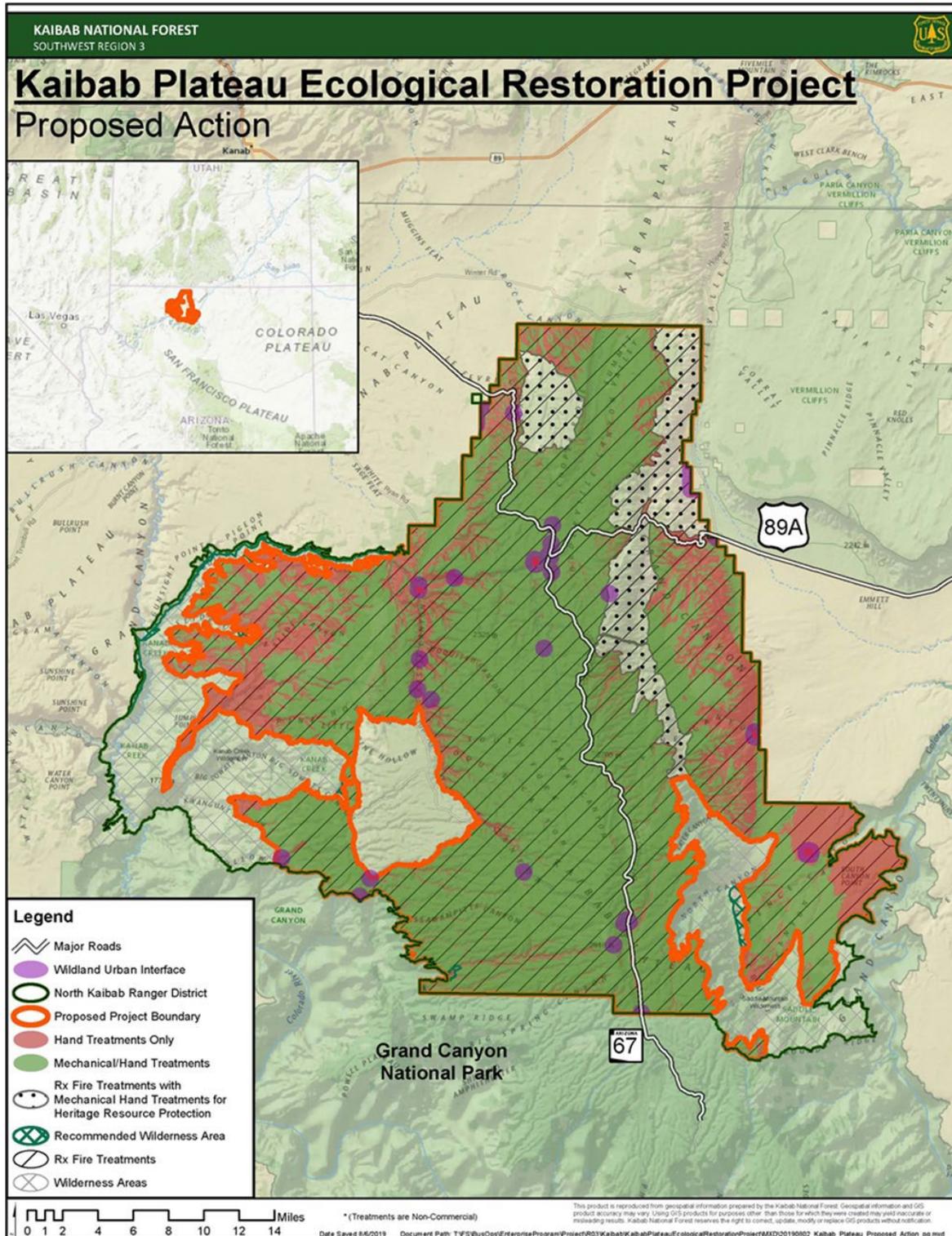


Figure 1. Project area for the Kaibab Plateau Ecological Restoration Project.

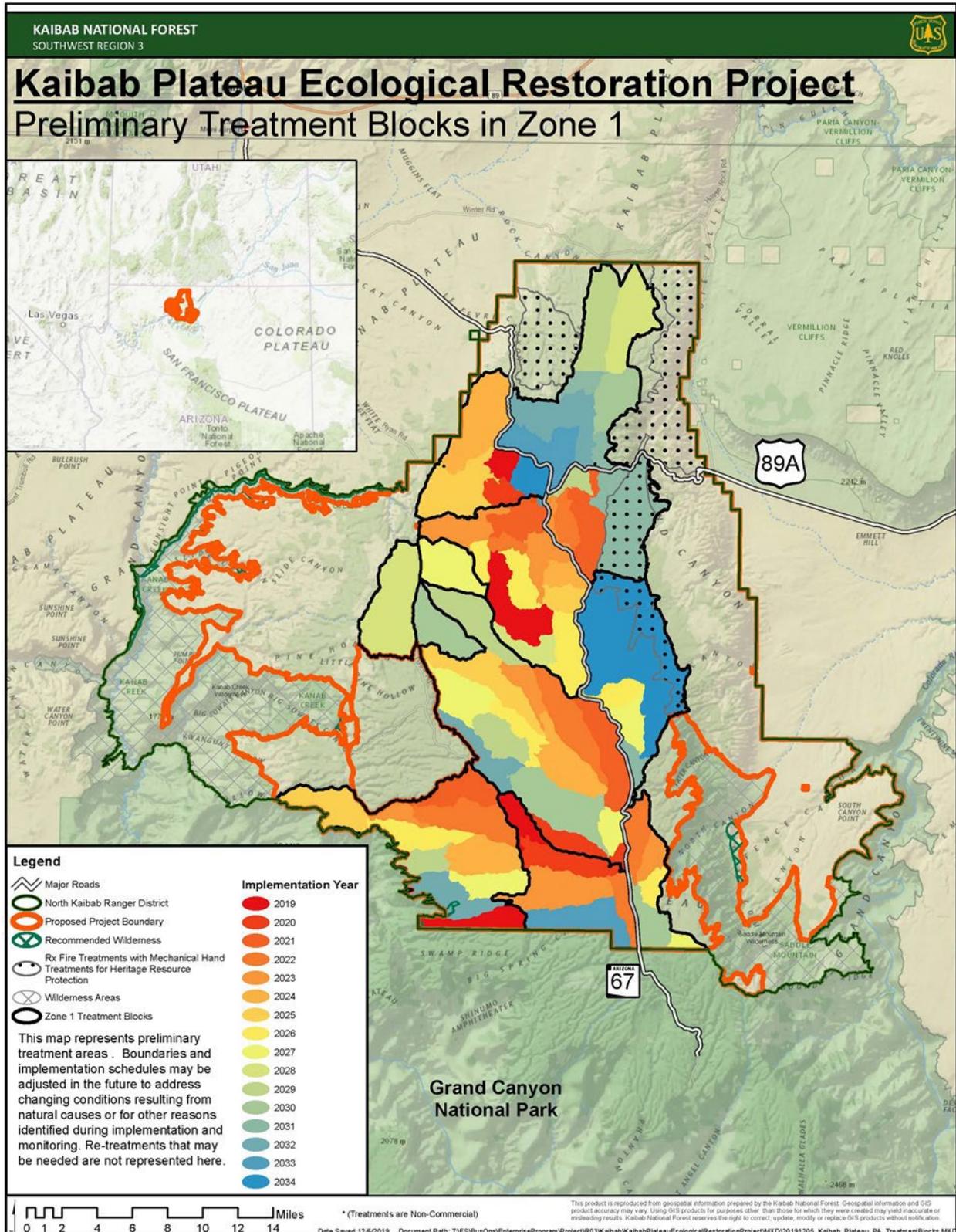


Figure 2. Zone 1 preliminary treatment blocks and implementation years.

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## APPENDIX A: CONCURRENCE

This appendix contains our concurrences with your “may affect, not likely to adversely affect” determinations for the endangered Fickeisen plains cactus (*Pediocactus peeblesianus* ssp. *Fickeiseniae*; cactus, cacti) and its critical habitat.

There is suitable and occupied habitat and designated critical habitat for the Fickeisen plains cactus on the North Kaibab Ranger District in the South Canyon area. Surveyors observed cacti in this area in 2004, and recent (2013) surveys found 62 plants distributed in several areas along the canyon rim. The Forest Service conducts monitoring of these documented populations on an annual basis. Potential habitat, but no Fickeisen plains cactus, occurs along the south rim of Snake Gulch near the east rim of Kanab Creek Canyon. Botanists determined that the previously noted Fickeisen plains cactus occurrences from the 1980s were misidentifications. The Forest Service surveyed the Snake Gulch area in April 2013 and did not locate any cacti.

Across the entire NKRD, there are 271 acres of Fickeisen plains cactus designated critical habitat, all within the South Canyon Critical Habitat Unit (CHU) 4. All of these acres overlap the action area, and all are within proposed treatment Zone 2. The Forest Service is proposing no prescribed fire or noncommercial mechanical and hand treatment within the Fickeisen plains cactus CHU, which is where most of the cacti occur.

### Conservation measures for Fickeisen plains cactus

To minimize effects to Fickeisen plains cactus its critical habitat, the Forest Service will follow the following conservation measures.

- Managers will only use hand treatments (e.g., hand line) within the Fickeisen plains cactus critical habitat units (CHU) or within 50 feet of known individuals outside of the CHU. Hand treatments may occur in these areas only when the cacti is typically retracted underground (November 1 through March 15) to avoid trampling. The Forest Service will conduct pre-implementation surveys to confirm the retracted status. Managers will remove cut fuels from critical habitat.
- In addition to Fickeisen plains cactus and Paradine plains cactus surveys, the Forest Service will assess non-native invasive species (e.g., cheatgrass, Russian thistle, etc.) abundance within critical habitat and the *Pediocactus* Conservation Area prior to project implementation to identify potential issues, and adjust treatment accordingly. The Forest Service will treat invasive plant species in accordance with Appendix B of the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (USDA Forest Service 2005).
- Post Implementation Monitoring: Annual monitoring of all federally listed and Forest Sensitive plant occurrences will occur for no less than two years following project implementation. If monitoring indicates unanticipated effects from treatments, a Forest Service botanist will re-evaluate site-specific treatment options prior to additional treatments occurring and will immediately contact the FWS to discuss potential effects

and recommendations.

- The Forest Service will assess the Pediocactus Conservation area and the Fickeisen plains cactus CHU for weeds pre-implementation. Following implementation, the Forest Service will monitor and document all ground-disturbing operations near weed-infested areas for at least five growing seasons, or the documented seed viability for the species of concern following completion of the project. They will continue to monitor until they have reasonable certainty that weeds are not present. The Forest Service will also provide for follow-up treatments based on inspection results. Monitoring will focus on invasive species affected areas (e.g. the eastside cheatgrass occurrences), areas with moderate-to-higher severity patches of fire, and invasive plant occurrences within 0.25 miles of known rare plant occurrences.

Additional measures and best management practices, such as weed prevention, treatment, and monitoring or those protecting biological soil crusts, would also serve to benefit Fickeisen plains cactus.

#### **Effects determination for Fickeisen plains cactus**

- Conservation measures will exclude prescribed fire, pile burning, mastication, or piling within the CHU and within 50 feet of plant occurrences outside of the CHU. If any occurrences of Fickeisen plains cactus occur outside of these areas they would be at low-risk of direct effects from project activities, especially broadcast burning, since they grow in generally sparsely vegetated areas and there is often low surrounding vegetation within that habitat to carry fire.
- The Forest Service will only conduct hand-treatments in the CHU and they will limit the timing of these treatments to periods when surveys show the cactus is underground. This will ensure effects to Fickeisen plains cactus from hand thinning are insignificant and discountable.
- The Forest Service will implement conservation measures to exclude all treatments within 50 feet of known Fickeisen cactus occurrences outside of the CHU. There is limited habitat for the cactus outside the CHU, but the requirement for pre-implementation surveys will aid in finding plants that occur outside the CHU and will minimize the potential for effects to the cactus outside of the CHU. Therefore, effects from prescribed fire, pile burning, mastication, piling, and hand thinning will be insignificant and discountable to plants occurring outside the CHU.

## **APPENDIX B: CONCURRENCE**

This appendix contains our concurrences with your “not likely to jeopardize” determination for the nonessential experimental population of California condor (*Gymnogyps californianus*).

### **Conservation measures for California condor**

- The project area will be kept clean (e.g., trash disposed of, tools and materials picked up) in order to minimize the possibility of condors accessing inappropriate materials.
- The Forest Service will advise all workers at the project site of the possibility of the occurrence of California condors in the project area. They will instruct project workers to avoid any interaction with condors and to contact immediately the appropriate Forest Service wildlife personnel if they observe condor(s) in the project area.
- Any project activity that may cause imminent harm to condors will temporarily cease until permitted personnel can assess the situation and determine the correct course of action. It may be necessary to postpone the activity until condors leave the area, or permitted personnel haze the condors.

### **Effects determination for California condor**

- Because of the California condor’s status as a nonessential experimental population, we treat these condors as though they are proposed for listing for section 7 consultation purposes. By definition, a nonessential experimental population is not essential to the continued existence of the species. Thus, no proposed action effecting a designated population could lead to a jeopardy determination for the entire species.