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December 4, 2017

Mr. Kenneth Born
District Ranger
Coronado National Forest, Santa Catalina Ranger District
5700 North Sabino Canyon Road
Tucson, Arizona 85750

RE: Catalina-Rincon FireScape Project

Dear Mr. Born:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1531-1544), as amended (Act). We received your March 28, 2016, request for consultation and biological assessment (BA) on April 4, 2016. At issue are impacts that may result from the proposed Catalina-Rincon FireScape Project located in Pima, Pinal, and Cochise counties, Arizona. The proposed action may affect the Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat, and the western yellow-billed cuckoo (*Coccyzus americanus*).

You have also requested our concurrence that the proposed action may affect, but is not likely to adversely affect the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Gila topminnow (*Poeciliopsis occidentalis*), and Gila chub (*Gila intermedia*) and its critical habitat. We concur with your determinations. The basis for our concurrences is found in Appendix A.

This biological opinion (BO) is based on information provided in the March 29, 2016, BA; the May 25, 2011, and December 3, 2012, Scoping Notices; telephone conversations; and, other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern, prescribed or wildland fire 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

- April 4, 2016: We received the preliminary BA and request for formal consultation
- May 26, 2016–September 25, 2017: We exchanged electronic mails regarding the project and met with Coronado National Forest (CNF) staff to collect additional project information.
- June 23, 2017: The CNF submitted their request for formal consultation.
- October 27, 2017: We submitted draft BO to the CNF for review.
- November 27, 2017: We received comments on the draft BO from the CNF.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Coronado National Forest (CNF) proposes to use a mix of fire and non-fire (i.e., prescribed cutting, mastication and grubbing, and fuelwood harvest) treatments to improve the condition of 10 vegetation communities in the Catalina and Rincon Mountains (Figure 1), with the goals of facilitating a decrease in vegetative fuels loading and improving ecosystem health. Attainment of project goals will facilitate progress toward vegetation conditions that support a more historic low- to moderate-intensity natural fire cycle in fire-adapted ecosystems, which, in turn, should lessen the probability that high-intensity fires will occur (Figure 2). In systems adapted to high-intensity fire, namely those with a high chaparral component, treatments will focus on reducing fuel hazard within the wildland-urban interface. Treatments should restore ecosystem structure by reducing surface fuels, ladder fuels, and the density of trees and shrubs. Weather factors, limited operating periods, and available funding will dictate the amount and type of treatment the CNF will implement in any given year. Implementation of the project would extend until at least 2033. This BO covers actions that would occur through 2033.

Fire Treatments

Both planned ignitions (called prescribed fires or prescribed burns) and use of unplanned ignitions that originate from natural causes (lightning) are proposed. Very steep slopes in the project area make fire the most practical tool for achieving desired conditions in those areas.

The Coronado Forest Plan provides direction that allows fire managers to use unplanned ignitions (e.g., naturally occurring lightning strikes) to meet the same resource objectives as described below for prescribed fire, as long as conditions for doing so are appropriate (for example, there are no structures or property threatened, desired conditions for resource objectives can be met). However, the CNF is not consulting on the effects of unplanned ignitions as part of this consultation; the CNF would address the effects of unplanned ignitions on listed species under emergency consultation. Therefore, we are not including an analysis of the effects of unplanned ignitions and the management actions taken to control and contain such fires on listed species in this BO.

The CNF designs planned ignitions to meet objectives specified in a written, approved plan (burn plan) and all regulatory requirements prior to implementation. Fire managers may ignite

prescribed fires by hand, mechanical, or aerial-firing methods. In general, CNF fire managers will refer to a prescribed fire that aims for varying levels of burn severity from low to moderate based on vegetation type and objectives using the abbreviation "Rx Fire," which will result in low-severity fire effects reducing dense shrub cover and canopy fuel ladders. Shrub and ground cover are targeted in semi-desert grassland, chaparral, and Madrean evergreen woodland habitats. No trees are targeted within riparian habitat, but where control lines are constructed, individual trees that could carry fire may need to be removed.

Fire Control Lines/Fuelbreaks

Fire managers use control lines to confine prescribed fire operations within control perimeters (see **Prescribed Cutting** section). Wherever feasible, control lines comprise existing features or barriers, including roads and trails. However, in some cases, construction of fire control lines may require more substantial cutting and clearing of vegetation. This includes removal of fuel ladders consisting of ground cover, shrubs, lower tree limbs, and in some cases, entire trees, within the width of the control line.

Prior to implementing prescribed burns and fire control lines, the CNF will construct or prepare lines one-half chain width (33 feet) constructed on either side of existing trails to form the boundaries of treatment units. Fire staff will construct a larger, one-chain fuelbreak (66 feet) outside the Pusch Ridge Wilderness between the Summerhaven and Lemmon Rock, Marshall Saddle, and Huntsman units within the Mountain Top group. Preparation of fire control lines includes thinning small diameter trees (up to 12" diameter-breast-height (d.b.h.), but mostly <9" d.b.h.), removing shrubs and doghair thickets, and pruning larger trees (>12" d.b.h.) up to 5 feet (ft) off the ground.

Pile Burning

Fire managers use pile burning to dispose of vegetation remaining after prescribed cutting and mechanical treatments. The CNF pile-burn plans would specify the parameters and conditions during which the risk of fire spread is low from burning these piles. Trees, shrubs, limbs, and dead and down woody material (generally larger than 1 inch in diameter) are gathered and piled by hand. Piles may range from about 5 feet in diameter and 4 feet high to approximately 15 feet in diameter and 8 feet high. Piles are carefully located to minimize scorch to the canopies and trunks of trees, particularly mature and old-growth trees.

Prescribed Cutting

The CNF proposes to use hand tools, chainsaws, or specialized mechanical harvesting and slash treatment equipment to cut vegetation. Managers would use prescribed cutting when needed to:

- Serve as a fire surrogate to restore desired, healthier vegetative structure;
- Minimize the potential for unwanted wildland fires by reducing surface and ladder fuels and decreasing contiguous, abnormally heavy fuel loads;

- Reduce ladder fuels;

- Pre-treat areas to reduce fuels in a way that enables the subsequent safe and effective application of prescribed fire; and,

- Treat wildland-urban interface areas in certain vegetation types.

The CNF would use prescribed cutting of trees and shrubs to meet treatment objectives, improve forest health and vigor, move towards desired conditions, and recruit snags. The desired future condition of each community determines species, size class, horizontal and vertical spatial arrangement, and residual stocking targets of prescribed cutting projects. In uneven-aged stands, prescribed cutting favors retention of a mix of tree sizes and age classes with consideration given to more fire-resistant species and sizes for retention. Additionally, within 300 feet from existing structures, vegetation treatments may be more intense than in areas farther away. The use of ground-based mechanical equipment will be limited to slopes of less than 55 percent.

Managers would also conduct prescribed burn areas following cutting ("Rx Cut/Rx Fire"). Prescriptions would vary depending on objectives. "Rx Cut d.b.h. /Rx Fire" concentrates removal of trees in the smallest d.b.h. classes. The maximum size tree removed would likely be close to 9 inches d.b.h. and no larger than 12 inches d.b.h. In the conifer forest and woodland vegetation types, managers would follow prescribed cutting with prescribed fire treatments.

As fire control lines are established, conditions may require the removal of herbaceous vegetation, pruning, cutting breaks in the fuel by hand, or clearing all vegetation down to mineral soil. Following prescribed fires, rehabilitation may involve returning previously pulled material back onto the control lines, hand-constructing water diversion channels, or laying shrubs or woody debris (any piece of dead woody material, such as dead boles, limbs, and large root masses) on the lines following burning.

In addition to rehabilitating a fire control line, other post-cutting activities may include:

- **Removal of woody debris** by hand or machine to an off-site location for other uses or burning. Fuelwood collection applies as a method of removal.

- **Chipping of woody debris**. The use of chipping is limited by the slope of the area. Chipped material may be dispersed over the treatment area to a depth no greater than 3 inches and/or transported offsite for other uses.

- **Lopping and scattering**, which disperses woody material on the ground to decrease fire intensity. Previously felled trees and shrubs are limbed, lopped, and bucked using chainsaws so that the resulting slash material lies closer to the ground surface (as opposed to creating burn piles). The slash material is then spread, more or less evenly, over the ground.

- **Piling and burning**, of woody material. See the *Pile Burning* section under Fire Treatments.

- **Planned or unplanned ignitions**, to reduce existing fuels and woody debris created during prescribed cutting activities. See planned and unplanned ignitions under Fire Treatments.

- **Pruning**, which may be applied along major National Forest System road corridors, within fuelbreaks, or in conjunction with fire control lines to remove ladder fuels and facilitate prescribed burning. Using hand tools and chainsaws, tree branches are pruned as close to the bole as possible without damaging it. Trees are generally pruned no higher than 10 feet above ground level or one-third of the tree height, whichever is less.

Mastication and Grubbing

Mastication and grubbing treatments reduce woody biomass across a larger area than is typically treated by prescribed cutting. The CNF intends to use these treatments as a supplemental treatment in higher elevation vegetation types when prescribed fire alone is not sufficient to achieve project goals, including safety goals. Mangers would burn areas following mastication and grubbing.

The use of machinery is justified when it is necessary to:

- Address broad-scale invasion (generally into grasslands) of woody species that are difficult to control with fire or herbicides (for example, multi-stemmed, shrubby species).

- Manage overabundant species that may germinate with fire and increase without frequent fire (for example, manzanita).

- Treat wildland-urban interface areas in some vegetation types.

Mastication

The CNF would use mastication to eliminate shrubs and small trees for ecological or fuel reduction purposes. Generally, a masticator is a tracked or rubber-tired machine that chops, shreds, and grinds small trees, limbs, shrubs, and dead woody debris into chips, which remain on site. Mastication is feasible where slope angles are 40 percent or less. Hand cutting may occur within pockets of vegetation on steeper slopes within mastication units. Mastication moderates fire behavior by reducing fuelbed depths to generally less than 6 inches. Removal of target species encourages the growth of desired plants, if the depth of masticated chips left in the area is shallow enough to allow regeneration (CNF has agreed to a depth of 3”).

Grubbing

In areas where mastication may be ineffective due to resprouting, the CNF would use grubbing to remove vegetation. Grubbing is the use of a tracked or rubber-tired machine to uproot shrubs and small trees. By removing the rooting zone of the plant, the potential for resprouting and survival is reduced.

"Fuelwood" also applies as a method to reduce the volume of masticated or grubbed material.

Fuelwood Harvest

Where terrain and access are feasible, the CNF would make dead, precut, or designated live material available to the public for fuelwood. Removal of this fuelwood would:

- Reduce fuels at little cost to land managers while benefitting end users.
- Displace the harvest of other trees for firewood or raw materials in order to achieve a carbon-cycle benefit.
- Pre-treat fuelbreaks for wildland fire treatments.

The CNF may use fuelwood collection as a primary or secondary treatment. As an initial treatment, fuelwood collection may serve to pre-treat the area and reduce fuel loads. As a secondary option, fuelwood collection may serve as a tool to remove woody material from prescribed cutting, mastication or grubbing treatments.

Treatment in Designated Wilderness

The proposed action includes using fire and non-fire methods within congressionally designated wilderness. Non-fire treatments act as a natural fire surrogate and are intended to reduce the potential for large-scale, high-severity, stand-replacing fires within the wilderness.

The CNF would implement the Minimum Resources Decision Guide (MRDG) to plan treatments in wilderness. Managers may use non-fire treatments, such as prescribed cutting by hand crews, to enhance existing control features. Wherever feasible, control lines would comprise existing features such as trails, drainage bottoms and exposed rock. In some instances, especially for prescribed fire, control features may be enhanced by hand crews using hand tools, including chainsaws, to allow for management of the burn event. Depending on the complexity and location of the burn event, the CNF may use helicopter support for fire line control and/or crew support and safety on a case-by-case basis. These activities would only occur if approved by the Regional Forester in the MRDG.

Treatment acres proposed within designated wilderness are identified in Appendix B of this BO. A total of 93,801 acres of proposed treatment units lay within designated wilderness.

Treatment Units

The interdisciplinary team identified 95 treatment units within the eight geographical groups of the project area. These units and their prescriptions are listed and depicted in the table and maps in Appendix B of this BO.

The CNF proposes to treat approximately 10,000 to 20,000 acres annually. Treatment units range in size from hundreds of acres subject to non-fire treatments (prescribed cutting and mastication) to thousands of acres for the application of prescribed fire. These estimates include between 100 and 500 acres of prescribed cutting and 50 to 500 acres of mastication.
A long-term goal of the project is to allow fire to maintain all fire-adapted vegetation types. Currently, much of the landscape has the potential to burn with uncharacteristic fire behavior. In these areas, it may take multiple treatments to reduce extreme behavior and meet desired conditions. For example, the managers may not burn the large prescribed fire blocks listed in Appendix B in a single operation, but each of these units may be broken into smaller areas for project implementation.

Several factors will determine treatment priority, most significantly current fuel loading and the existing condition of vegetation in a parcel relative to desired ecological conditions. Areas of treatment prioritization will also be those within or in close proximity to the wildland-urban interface, which may include residential and commercial areas. Other priority areas may include natural features-at-risk, such as threatened and endangered species habitat, watersheds, wilderness, and sensitive heritage resources.

Acreages of treatment units and corresponding treatment options are approximations based on maps and models. Actual, on-the-ground acreages may differ. Actual acres treated would depend on objectives, environmental conditions, the occurrence of natural fire starts, funding, and availability of personnel. Fire treatment acreage would likely increase over the lifetime of the project as more acres are treated, creating conditions where fire can be safely returned a more natural role.

Conservation Measures

Implementation of the project would adhere to stringent design features that developed to protect the inherent values and characteristics of native wildlife, plants, fish, and their habitats, and the soils, scenery, air quality, and historic and archaeological sites in each ecological unit. As activities are proposed, fire and fuels managers would review treatment parameters to ensure that they are within the scope of the proposed action and that they are consistent with the design features. Such prescreening would help assess whether the anticipated effects of treatments fall within acceptable boundaries.

Projects in the area would share many design features (see Appendix B of the Environmental Assessment; USFS 2016). Many of these would apply regardless of the presence of sensitive resources. In some cases, the need to protect life and property would override design features. However, in time, with sufficient treatment around developments, allowing fire to resume its natural role in the Santa Catalina and Rincon Mountain ecosystems would be an increasingly feasible option. General goals and the design features are:

1. **To ensure safe fire operations**, the CNF will develop a prescribed burn plan prior to the initiation of each burning operation, including burning of piles. A burn plan would include, but would not be limited to, the following: unit description, specific prescribed burn objectives, public notification procedures, coordination with other regulatory

agencies (such as air quality regulators), hazard analysis, contingency plan, firing procedures, risk assessment, mitigation measures, estimated fire behavior, acceptable weather variables, and prescribed burn organization.

2. **To maintain air quality**, fire managers would cooperate with Federal, State, and local regulatory agencies to protect air quality in accordance with the requirements of the Clean Air Act and state and local regulations.

3. **To minimize impacts of operations on the landscape**, managers would limit the use of off-road vehicles during project activities. The creation of new access routes, if needed for suppression activities, would be limited. Staff would create new routes only if other alternatives are not available. Areas of significant human activity during fire suppression operations, such as fire crew camps, landing strips, and equipment staging areas, would not be located on or next to sensitive resources or habitat of special-status species. The CNF will follow best management practices to prevent the introduction or spread of invasive exotic species by vehicles, equipment, or workers (Cal-IPC 2012, as cited in BA).

4. **To prevent erosion, protect soils, and maintain water quality**, in steep areas (slopes generally over 40%), fire staff would construct fire control lines in accordance with CNF and Arizona Department of Environmental Quality erosion prevention standards. The CNF would not apply high-intensity fire on sensitive soils, because this may promote water repellency, nutrient leaching, and erosion. The Forest will rest burned areas from grazing for specified periods following fire and BMPs implemented to minimize negative effects to watersheds (e.g., increased erosion) and riparian habitat. Fire managers would design treatments within or adjacent to riparian and aquatic habitats to provide long-term benefits to aquatic and riparian resources by reducing threats associated with dewatering and surface disturbance, and/or by improving the condition of the watershed and enhancing watershed function.

5. **To protect wildlife, fish, plants and their habitats**, the CNF would implement specific conservation measures/design features (see Appendix C). As the analysis proceeds, potential effects would be assessed for federally listed threatened, endangered, or proposed species, as well as Forest Service Region 3 sensitive species, Forest management indicator species, and species covered under the Migratory Bird Treaty Act. Such an analysis would aid in defining specific mitigation measures to minimize or assure avoidance of impacts.

6. **To protect range resources**, grazing areas to be treated would be rested prior to and following fire treatments to ensure that fine fuels are present to carry a prescribed fire and to ensure plant recovery and soil protection. Project activities would be coordinated with grazing permittees to ensure success of burning operations and minimize adverse impacts.

7. **To protect recreation uses and facilities**, the CNF would conduct fire and cutting activities during low-use periods. In addition, managers would remove slash and debris, rehabilitate impacted sites, and post informational signs alert users of potential conflicts.

8. **To protect scenic quality**, proposed treatments would be designed to blend with the natural environment as much as is practical. Specific instructions on techniques to reduce visual impacts would be implemented.

9. **To protect cultural and historic sites and resources**, all historic and cultural sites would be surveyed, protected, and/or avoided.

The CNF developed specific design features to eliminate or reduce adverse effects of the actions on sensitive resources, as shown in Appendix C. These design criteria are part of the proposed action. Managers will consult an implementation guide for each burn plan, which will include a checklist of potential resource concerns and associated design criteria, prior to carrying out site-specific actions. Resource concerns identified as being relevant to each proposed treatment area will determine which design criteria to apply to each site. Some variation in application of the design criteria is possible, but effects of all actions must remain within maximum effects predicted in the environmental assessment and biological assessment.

From Appendix C, the proposed project includes the following conservation measures specific to the Mexican spotted owl and Western yellow-billed cuckoo:

Mexican Spotted Owl

<u>Mexican Spotted Owl Recovery Habitat (foraging and dispersal)</u>

Prescribed fire (preferably low to moderate-intensity) would be used to maintain and enhance Mexican spotted owl habitat inside and outside of the Protected Activity Centers (PACs) and recovery nest/roost replacement habitat by varying the management prescriptions to:

- Reproduce natural disturbance patterns;
- Maintain native vegetation in the landscape, including early seral species;
- Allow natural gap processes to occur, thus producing horizontal variation in stand structure; and
- Reduce fuels to promote future low to moderate-intensity fire in protected activity centers and adjacent areas.

Additionally, to alleviate the overall impacts of project activities occurring simultaneously across the landscape within PACs, the CNF, in cooperation with the USFWS, will develop and implement a priority treatment schedule. The CNF's current proposed treatment schedule is shown in Figure 3.

Protected Activity Centers and Nest/Roost Replacement Recovery Habitat

Biologists will survey PACs for occupancy to determine the location of nest trees and to delineate core areas prior to implementing treatments within the PACs.

Additionally, within PACs, the Forest Service will implement the following measures from the Recovery Plan (USFWS 2012a):

- Within each PAC, the Forest Service will designate a 100-acre core area, centered around the nest/roost site.
- Within PACs, the Forest Service would use primarily low-intensity fire to reduce fuel hazard and to improve habitat conditions for owl prey.
- The Forest Service would conduct prescribed fire treatments only during the nonbreeding season (September 1 – February 28) to minimize any potential effects to breeding owls.
- Fire managers would consult resource advisors when making decisions about prescribed fire activities. Resource advisors would inform fire staff of resource concerns and the reasoning for fire objectives in owl habitat. Fire staff would notify resource advisors if Mexican spotted owls are seen during fire operations.
- Fire tactics would be implemented that keep fire severity low and limited to the understory with occasional single-tree torching in Mexican spotted owl PACs.
- Where appropriate, fire managers would ignite areas from the top of ridges, (preferably at night or when the relative humidity is higher) and allow fire to back down into habitat to reduce fire intensity and severity (the goal is to limit effects to the overstory, with only occasional single-tree torching).
- Fire managers will avoid building fire line and/or congregating people and/or equipment within, or conducting flights over, PACs.
- When possible/feasible, fire managers will use tactics that protect the loss of snags, and will avoid the removal of interior snags and large trees if these trees do not pose a safety issue.

Western Yellow-Billed Cuckoo

Pre-treatment survey:

- Protocol surveys (Halterman et al. 2016) would be conducted within cuckoo riparian habitat to determine occupancy in the year prior to implementing treatments. See Conservation Recommendations for post-treatment surveys.

The Forest Service would use prescribed fire (low- to moderate- intensity) to maintain and enhance western yellow-billed cuckoo woodland habitat within drainages. The prescribed fire objectives are:

- Reproduce natural disturbance patterns;
- Maintain native vegetation in the landscape, from early to late early seral species;
- Allow natural gap processes to occur, thus producing horizontal variation in stand structure; and,

- Reduce fuels to promote future low-intensity fire in drainage bottoms and adjacent areas.

Additionally, treatment to minimize effects to cuckoos would be implemented as follows:

- Project activities will cease from July 1 – October 1 in cuckoo riparian habitat (the western yellow-billed cuckoo's breeding season in southern Arizona is from May 15 – September 30).
- Prescribed burning will be avoided within the action area during the monsoon season (July 1 – October 1, which coincides with much of the yellow-billed cuckoo's breeding season).
- When creating control lines for prescribed burns in riparian habitat, no more than 50% of a given riparian drainage would be modified for treatment in any given year.
- At least five years would be required between re-entries into any given riparian area that is to be treated more than once during the life of the project.
- A mosaic of conditions within riparian habitat across the landscape within the Firescape analysis area would be ensured by separating riparian fire line treatments both spatially and temporally.
- Resource advisors would be consulted when making decisions about prescribed fire activities. Fire staff would be informed of resource concerns and the reasoning for fire objectives in cuckoo riparian habitat. Staff will notify resource advisors if they observe cuckoos during fire operations.

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 action area encompasses the Santa Catalina Ranger District on the "sky island" ranges comprising the Catalina and Rincon mountains, an area south of the community of Oracle, Arizona, and north and east of Tucson (Figure 1). All lands in the action area cover 265,000 acres and include two wilderness areas. The Pusch Ridge Wilderness on the west side of the Santa Catalina Mountains contains rugged high-visual-quality mountain formations bordering the Tucson metropolitan area. The Rincon Mountain Wilderness abuts Saguaro National Park and is characterized by steep and rocky terrain with limited access.

Description of the Action Area

The Santa Catalina and Rincon mountains sit north and east of Tucson. The rugged mountains are characterized by steep rocky slopes intersected by numerous drainages radiating out to the desert floor. Vegetation changes from southwestern desert scrub and desert grassland at the lower elevations to chaparral and oak savanna/woodland, then to coniferous woodland at the highest elevations. Annual precipitation varies considerably, averaging about 12 inches falling at the lower elevations and 25 to 30 inches near the summits. Precipitation has historically been

split between a frontal winter season and a summer thunderstorm season. Predictions for climate change in the Southwest lean toward drier winters in the future.

The lands within and surrounding the action area are comprised of Federal, State, and private lands. The irregular boundary of the project area follows features that are logical for fire management planning, primarily drainages, ridges and roads. Across these ownerships and jurisdictions is an array of vegetation types across varying elevations, topography, soils and geologic influences referred to as "ecological units." Twenty-nine ecological units have been defined in the action area. In general, they include desert scrub, grassland, shrubland, woodland, and forest vegetation community types.

Fire has played an important ecological role in the history of most of these ecological types in southeastern Arizona. Regular intervals of naturally occurring fire restricts the growth of shrubs in grasslands, thins woodlands and forests of fire-intolerant trees, increases stream flow, and renews wildlife habitat. Fires in the woodlands and forests of southeastern Arizona has generally occurred at a ground level, burned at low to moderate intensity, and maintained an open and grassy aspect.

The fire history recorded by tree rings indicates that, since the beginning of the early 20th century, the frequency of natural fire has decreased dramatically. Tree-ring research has shown that for many centuries, the Santa Catalina and Rincon Mountains shared broadly similar fire regimes and ecosystem properties. However, since the early 20th century, natural fire regimes have been significantly altered because of grazing (which removes the fine fuels that carry surface fire) and continued fire suppression. Because of the heavy recreational use and special uses that the Coronado permits in the Catalina Mountains, wildland fires continue to be managed by suppression, while funds for fuels treatments have been aimed at thinning the areas around values at risk.

The resulting century of natural fire exclusion has led to unnatural accumulation of fuels throughout much of the mid- and upper-elevation vegetation types in the project area. At lower elevations, recent invasions by exotic grasses have altered fire regimes by increasing the potential for intense, spreading grass fires having no historical or ecological precedent. Warming and decadal climate variability, particularly the current multi-year regional drought in the Southwest, exacerbate the situation because they increase tree mortality and foster weather conditions that promote rapid fire spread and surface-to-crown fire transition.

As a result of the convergence of these factors, there have been several recent high-intensity, mountain-range scale wildland fires in the Santa Catalina Mountains, notably the 2002 Bullock Fire (30,560 acres) and the 2003 Aspen Fire (84,300 acres). Together, these two events burned 44% of the forested areas of the Catalina mountain range, destroyed 467 buildings and other infrastructure, and cost $30 million to suppress.

The absence of major roads and improvements has written a different story for the Rincon Mountains. Land managers have long been aware that fire is a natural and necessary disturbance in the ecosystems above the Sonoran Desert on these mountains. In the Rincon Mountains, Saguaro National Park's prescribed fire program has been addressing the mid- and upper-

elevation fuel accumulations. The Park's prescribed fire program began in 1984 and treatments continue today. Over the last 10 years, the Park Service has burned over 5,100 acres under a suppression strategy; 6,797 acres under a wildland fire for resource benefit (allowing naturally ignited fires to burn within strict program guidelines) strategy; and over 4,300 acres by conducting prescribed burns.

Prescribed burns are ignited by managers under stringent planning requirements to reduce fuels, reintroduce fire, and simulate natural fire cycles. Eventually, this reduction of fuels allows managers to safely use wildland fires to accomplish ecological restoration goals. This demonstrates the difference between the more natural fuel loading in the Rincon Mountains and the unnatural buildup of fuels in the Santa Catalina Mountains. On the same day that the Aspen Fire started in the Santa Catalina Mountains, lightning in the Rincon Mountains ignited the Helen's II Fire, which burned for 53 days, consumed 3,500 acres, and received little press because it was not a threat to people and structures.

Interagency collaborators estimated the potential effects of a wildland fire in the project area using the model FlamMap over a regional fuels map developed by the planning team. Flame length is a good indicator of fire behavior and effects on the landscape. The red areas on Figure 2 depict locations where wildland fire in the project area, under the specified conditions, is predicted to spot, cause crown fires and be very difficult to control. This sample model run is based on 90th percentile weather and fuel conditions for southeastern Arizona. Using 97th percentile conditions observed during the large wildland fires of the past decades would turn additional areas on the map red, indicating flame lengths greater than 11 feet.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

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

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of each species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild. The jeopardy analysis in this BO considers the range-wide survival and recovery needs of each species and the role of the action area in its survival and recovery as the context

for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

This BO relies on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02a. In accordance with policy and regulation, the adverse modification analysis in this BO relies on four components: 1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat for the Mexican spotted owl in terms of physical and biological features, the factors responsible for that condition, and the intended value of the critical habitat for conservation of the species; 2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat for conservation of the species in the action area; 3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the physical and biological features and how that will influence the value of affected critical habitat units for conservation of the species; and 4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the physical and biological features and how that will influence the value of affected critical habitat units for conservation of the species.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the species' critical habitat are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would not preclude or significantly delay the current ability for the physical and biological features to be functionally established in areas of currently unsuitable but capable habitat) such that the value of critical habitat for the conservation of the species is not appreciably diminished.

MEXICAN SPOTTED OWL

Status of the Species and Critical Habitat

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

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

The spotted owl occurs in forested mountains and canyonlands throughout the southwestern United States and Mexico (Gutiérrez et al. 1995). It ranges from Utah, Colorado, Arizona, New

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

In addition to this natural variability in habitat influencing owl distribution, human activities also vary across the owl's range. The combination of natural habitat variability, human influences on owls, international boundaries, and logistics of implementation of the Recovery Plan necessitates subdivision of the owl's range into smaller management areas. The 1995 Recovery Plan subdivided the owl's range into 11 "Recovery Units" (RUs): six in the United States and five in Mexico. In the revision of the Recovery Plan, we renamed RUs as "Ecological Management Units" (EMUs) to be in accord with current USFWS guidelines. We divide the Mexican spotted owl's range within the United States into five EMUs: Colorado Plateau (CP), Southern Rocky Mountains (SRM), Upper Gila Mountains (UGM), Basin and Range-West (BRW), and Basin and Range-East (BRE) (USFWS 2012a, p. 9). Within Mexico, the Revised Recovery Plan delineated five EMUs: Sierra Madre Occidental Norte, Sierra Madre Occidental Sur, Sierra Madre Oriental Norte, Sierra Madre Oriental Sur, and Eje Neovolcanico.

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

We are currently working with the Southwestern Region of the Forest Service to conduct a pilot study for the population monitoring recommended in the Revised Recovery Plan (USFWS 2012a). The effort to conduct this work has occurred during the 2014-2016 breeding seasons on National Forest System (NFS) lands. The Recovery Team, Forest Service, and the Rocky Mountain Bird Observatory (RMBO, contractor) are continuing to collect data and develop a strategy for incorporating additional lands (e.g., National Park Service, Bureau of Land Management, Department of Defense) into the monitoring. Currently, based on the work conducted by the Forest Service and RMBO, we have a process for conducting rangewide population monitoring, but we need to further develop the potential strategy for collecting rangewide habitat monitoring data.

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

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

Currently, high-severity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic wildland fire is probably the greatest threat to the Mexican spotted owl within the action area. As throughout the West, fire severity and size have been increasing within this geographic area. Landscape level wildland fires, such as the Rodeo-Chediski Fire (2002), the Wallow Fire (2011), and the Whitewater-Baldy Complex (2012) have resulted in the loss of tens of thousands of acres of occupied and potential nest/roost habitat across significant portions of the Mexican spotted owl's range. Although owls will forage in severely burned areas, habitat is often lacking for nesting and roosting in these areas, particularly when high severity fire affects large patches of habitat (Jones et al. 2016). Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to owls through habitat modification and disturbance. As the human population grows in the southwestern United States, small communities within and adjacent to wildlands are being developed. This trend may have detrimental effects to spotted owls by further fragmenting habitat and increasing disturbance during the breeding season.

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

long-term changes to vegetation, and to invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

Historical and current anthropogenic uses of Mexican spotted owl habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities have the potential to reduce the quality of owl nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout the range of the owl and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing throughout the Southwest, especially in meadow and riparian areas. There is anecdotal information and research that indicates that owls in heavily used recreation areas are much more erratic in their movement patterns and behavior.

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

Critical habitat

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

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

- Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

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

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

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

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

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the species, critical habitat, and factors affecting species environment and critical habitat within the action area

The action area is located within the Basin and Range West (BRW) EMU. In this EMU, Mexican spotted owl use a wide array of habitat other than strictly mixed conifer, pine-Gambel oak, and riparian. Mexican spotted owls also use Madrean pine-oak, riparian forest and rocky canyons in the BRW EMU. However, throughout the range of the species, owls primarily rely on mixed conifer habitat. In the mountains of southeastern Arizona (including in the action area), other habitat types used by Mexican spotted owl are typically adjacent to mixed conifer habitat.

Protected Activity Centers

The CNF currently has designated 18 Mexican spotted owl PACs in the Santa Catalina Mountains (Figure 4 and Table 1). PACs in the Rincon Mountains are on lands managed by Saguaro National Park, and are not covered under this consultation. Stand conditions for nest/roost replacement habitat within the Santa Catalina Mountains currently meet the minimum desired conditions defined in Table C.3 of the Recovery Plan for pine-oak habitat in the BRW (USFWS 2012a), although representation in each size class (0-12” d.b.h., 12-18” d.b.h., and >18” d.b.h.) is greater than the preferred uneven-aged distribution of trees. However, it is beneficial to have more larger-diameter trees within a PAC. A balance of age classes within a PAC is not the preferred condition so, at lease within PACs, this over-representation of larger diameter trees is desirable. The CNF last conducted surveys in the Santa Catalina Mountain PACs in 2016, although information from the mid-season report for 2017 is also included in Table 1. In addition, surveys have also occurred on Green Mountain, which contains suitable habitat (Table 1).

Table 1. Survey data for designated Mexican spotted owl protected activity centers within the project area. Note that surveys were not conducted from 2008-2009 and from 2011-2015. PAC=Protected activity center; A=Absence inferred; O=Occupancy by a pair inferred or confirmed; M=Male inferred or confirmed; NN=Non-nesting inferred; NS=Not surveyed; NT=Nesting observed, location recorded; NU=Nesting status unknown; P=Presence of single (unknown sex) inferred or confirmed; #Y= Number of fledged (branched and out of nest) young observed.

PAC	**Number**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009 through 2015**	**2016**	**2017 ****
Barnum Rock	0505002	O, NN	O, 1Y	O, NU	O, NT, 0Y	O, NU	M, NU	O, NN	O, NN	NS	NS	A	O, NU?
Bear Canyon	0505001	A	A	A	A	A	A	A	A	NS	NS	A	A?
Bear Wallow	0505006	A	M	M	M	A	A	O?	A	NS	NS	A	A?
Butterfly Peak	0505016	O, NN	O, 2Y	O, NU	O, 1Y	0, 3Y	O, 2Y	O, NN	O, 2Y	O, NU	NS	O, NT, 2Y	O, NT, 2Y
Canada Del Oro	0505018	NS	NS	NS	NS	NS	O, Y?*	O, NU*	O, NU*	NS	NS	O, NT, 1Y	O, NN?

PAC	Number	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 through 2015	2016	2017 **
Crystal Spring	0505007	M	O, NU	M	M	O, 4Y	O, 2Y	O?, NU	O, NU	NS	NS	O, NU, 0Y+ 1M	O, NT, Y?
Upper Edgar Canyon	0505015	O, NN	M	NS	O, NU	O, 3Y	O, 1Y	O, NN	O, NN	O, NU	NS	O, NU	O, NT, Y?
Lemmon Rock	0505011	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	O, NU, 0Y	O, NT, 2Y?
Loma Linda	0505008	NS	M	A	A	A	O, 1Y	A	A	NS	NS	O, 1Y	O, NT, Y?
Marshall Gulch	0505009	M	M	A	NS	O, NN	O, 1Y	O, NN	O, 2Y	NS	NS	O, NT, 2Y	O, NT, 1Y
Maverick	0505017	NS	NS	NS	NS	NS	O, NU	O?, NU	O, NU	NS	NS	O, NU, 0Y	O, NT, Y?
Novio Spring	0505005	O, NN	O, NU	O, NU	O, NT, 0Y	O, 2Y	O, 2Y	O, 1Y	O, NN	NS	NS	O, NT, 0Y***	O, NT, Y?
Palisades	0505004	A	A	M	A	A	A	A	A	NS	NS	A	A?
Red Ridge	0505014	O, NU	NS	M	O?	O, NN?	A	O, NU	O, NU	NS	NS	O, NT, 2Y+ 1F	O, NT, Y?
Reef of Rock	0505012	NS	NS	NS	NS	NS	O, 2Y	M, NU	M, NU	NS	NS	O, NT, 0Y	O, NT, Y?
Ski Valley	0505010	O, NN	M	M	O, NU	O, 2Y	O, 2Y	O, NN	O, NN	NS	NS	O, NT, 1Y	O, NT, 0Y
Shovel Springs	0505013	NS	NS	NS	NS	NS	NS*	NS*	NS*	NS	NS	O, 2Y	O, NU, Y?
Sollers	0505003	A	A	A	A	A	A	A	A	NS	NS	A	A?
Green Mountain	No PAC #	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	O, 1Y	O, NT, Y?
Rose Canyon	No PAC #	NS	NS	A	A	A	NS	NS	NS	NS	NS	NS	NS
Spencer Canyon	No PAC #	NS	NS	M	NS	NS	NS	NS	NS	NS	NS	NS	NS

*In 2005-2007, the pair of owls detected just north of the Shovel Springs PAC boundary was called the Shovel Springs pair. Due to those detections, a new PAC was created (Canada del Oro). What used to be called the Shovel Springs pair was actually within Canada del Oro PAC; therefore, the occupancy table was changed to reflect that pair was in the Canada del Oro PAC even though at the time the Canada del Oro PAC did not exist.
** Information for 2017 is from the mid-season report, not the final report; therefore, PAC status may change.
*** The female Mexican spotted owl from Novio Spring PAC was seen carrying her dead young.

Within the action area, fire has affected all PACs within the past 18 or more years, primarily from the 2002 Bullock Fire and 2003 Aspen Fire (Table 2). Fire effects within each PAC were a mix of low- to high-severity, ranging from 46% of the PAC affected by fire to over 99% of the PAC affected by fire. Table 2 summarizes the fire effects in each PAC.

Table 2. Acreage of Mexican spotted owl protected activity centers (PACs) and core areas burned in 2002 Bullock Fire and 2003 Aspen Fire within the Catalina-Rincon Firescape project area.

Fire Name	PAC Number	PAC Name	PAC Acres/Core Area Acres	PAC/Core Area Low Severity Burn ac (% total PAC)	PAC/Core Area Moderate Severity Burn ac (% total PAC)	PAC/Core Area High Severity Burn ac (% total PAC)	PAC/Core Area Total acres burned (% total PAC)*
Aspen	0505001	Bear Canyon	550/100	256 (46) / 77	28 (5) / 0	63 (12) / 22	347 (63) / 99
Bullock	0505002	Barnum	561/100	474 (84) / 90	74 (13) / 9	11 (2) / 1	559 (99) / 100
Aspen	0505003	Sollers	564/100	213 (38) / 11	97 (17) / 31	176 (31) / 57	486 (86) / 99
Aspen	0505004	Palisade Canyon	482/100	219 (45) / 71	107 (22) / 20	49 (10) / 5	375 (77) / 96
Bullock	0505005	Novio Spring	580/100	444 (76) / 61	3 (.5) / 0	84 (14) / 39	531 (91) / 100
Aspen	0505006	Bear Wallow	539/100	102 (19) / 5	136 (25) / 36	13 (2) / 2	251 (46) / 43
Bullock	0505007	Crystal Spring	536/100	167 (31) / 43	10 (2) / 0	339 (63) / 57	516 (96) / 100
Aspen & Bullock	0505008	Loma Linda	553/100	39 (7) / 0	55 (10) / 0	437 (79) / 100	531 (96) / 100
Aspen	0505009	Marshall Gulch	548/100	197 (36) / 68	268 (49) / 19	52 (9) / 3	517 (94) / 90
Aspen	0505010	Ski Valley	552/100	77 (14) / 54	81 (14) / 4	330 (60) / 5	488 (88) / 63
Aspen	0505011	Lemmon Rock	592/100	116 (20) / 12	381 (64) / 81	65 (11) / 0	562 (95) / 95
Aspen	0505012	Reef of Rock	570/100	97 (17) / 48	347 (61) / 52	125 (22) / 0	569 (100) / 100
Aspen	0505013	Shovel Spring	822/100	550 (67) / 56	253 (31) / 44	5 (.6) / 0	808 (99) / 100
Aspen	0505014	Red Ridge	585/100	83 (14) / 24	212 (36) / 38	285 (49) / 38	580 (99) / 100
Bullock	0505015	Upper Edgar Canyon	576/100	445 (77) / 93	100 (17) / 7	28 (5) / 0	573 (99) / 100
Bullock	0505016	Butterfly Peak	563/100	332 (59) / 71	0 / 0	219 (39) / 28	551 (98) / 99
Bullock	0505017	Maverick	558/100	452 (81) / 80	53 (9) / 0	52 (9) / 20	557 (99) / 100
Aspen	0505018	Cañada del Oro	682/100	363 (53) / 44	315 (46) / 56	3 (.4) / 0	681 (99) / 100
		Coronado National Forest Total	**10,414/1,800**	4,626 (44)	2,520 (24)	2,336 (22)	9,482 (91)

*Remaining acres within PACs are either unburned or had cloud cover; therefore, severity could not be determined.

Recovery Habitat

Vegetation types within the action area that may support recovery habitat include approximately 2,770 acres of mixed-conifer forest, 2,702 acres of ponderosa pine (with Madrean oak species), 22,839 acres of Madrean pine-oak on granitic and similar soils, and 2,878 acres of Madrean pine-oak woodland on metasedimentary derived soils. The mixed-conifer occurs at the highest elevations of the mountain, with small pockets of ponderosa pine directly below. These in turn grade into Madrean pine-oak woodland, with very few areas within the action area classified as

purely ponderosa pine; almost all of the ponderosa pine includes a component of Madrean oak species. Stand conditions in recovery habitat near PACs currently meet the minimum desired conditions defined in Table C.3 of the Recovery Plan for pine-oak habitat in the BRW (USFWS 2012a), although representation in each size class (0-12" d.b.h., 12-18" d.b.h., and >18" d.b.h.) is greater than the preferred uneven-aged distribution of trees.

Nest/roost replacement habitat has not been mapped in the Santa Catalina Mountains. However, two areas of pine-oak, one to the north of Novio Spring and the other to the north of Mount Bigelow (just east of Westfal Knob), are areas that could potentially be managed for nest/roost habitat. These areas are similar to canyons that Mexican spotted owls currently use for nesting and they are not within designated PACs. Prescribed fire is the only treatment proposed within these areas (no thinning or fuels reduction treatments will occur).

Critical Habitat

Within the action area, a total of 241,851 acres of critical habitat in the Basin and Range West 11 (BR-W-11) critical habitat unit (CHU) will be treated. Stand exam data in these areas is lacking, in part because there has been no true commercial timber industry within these mountain ranges and the terrain is steep and inaccessible. As a result, the distribution of PCEs related to forest structure is not known for the district. However, these same steep slopes historically have prevented past logging over much of the area. For this reason, the condition of Mexican spotted owl critical habitat within the action area is largely the result of altered fire regimes that tend to promote high numbers of small diameter trees dispersed across the landscape growing under the shade of larger, older trees.

According to fuel models included in the Environmental Assessment for the project, 74% of the analysis area could have flame lengths in excess of 4 ft, and greater than 50% of the area could have rates of spread at greater than 40 chains per hour. This information indicates that high-severity fire currently poses a threat to Mexican spotted owl critical habitat. Such fires could greatly reduce PCEs associated with forest structure and prey availability.

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 Mexican spotted owl and habitat

The CNF proposes to use a mix of fire and thinning treatments to improve the condition of vegetation communities in the Santa Catalina and Rincon Mountains, with the goals of facilitating a decrease in vegetative fuels loading and improving ecosystem health. Within

PACs, all treatments will be conducted outside the breeding season, although trees may be marked within the breeding season. Treatments within PACs and core areas include burning at low to moderate intensity. Thinning (Rx Cut small d.b.h., meaning trees up to 12" d.b.h., but mostly 9" d.b.h. or less) will occur on 3,177 acres within the total 10,430-acre PAC area, but not within core areas (Table 3). Outside of PACs (in recovery habitat), fire and non-fire treatments may occur at any time of year, including adjacent to PACs and within 0.25 mile of core areas during the breeding season. In these areas, the CNF will design thinning prescriptions that will avoid bringing stand conditions below the minimum desired conditions described in Table C.3 of the Recovery Plan (USFWS 2012a), and will include managing some areas as nest/roost replacement habitat. These areas have not yet been mapped, but likely include areas north of Novio Spring and to the north of Mount Bigelow (just east of Westfal Knob), as described above. Over the long-term, implementing Recovery Plan guidance should result in positive impacts to the owl and its habitat. The CNF will implement measures to minimize effects to key habitat components (such as retaining large trees, large snags, etc.) and the owl (such as conducting forestry operations outside the owl breeding season when in PACs). However, in the short-term, direct and indirect effects to the Mexican spotted owl and its habitat may include disturbance (from fire and thinning treatments near PACs outside the breeding season, including smoke), and the loss or modification of key habitat components due to fire and mechanical removal. While the proposed action may result in short-term adverse effects to the species and its habitat, we also expect that implementation would reduce the potential for severe wildfire and provide increased protection to existing and future Mexican spotted owl habitat.

Table 3. Acres of Mexican spotted owl protected activity centers/core areas, and vegetation types and treatments prescribed within each protected activity center/core area. Rx fire = prescribed fire; Rx cut small d.b.h. = prescribed cutting of small diameter trees (< 12" d.b.h.).

Acres of Mexican Spotted Owl Protected Activity Centers/Core Areas	**Acres of Vegetation Types Within Each Protected Activity Center/Core Area**	**Acres of Each Treatment Type Within Each Vegetation Type in Protected Activity Centers/Core Areas**
Shovel Spring – 722/100	Juniper-piñon woodland 172	Rx fire, light:172
	Madrean Pine-Oak 550/100	Rx cut small d.b.h./Rx fire: 47 Rx fire: 5 Rx fire, light: 498/100
Lemmon Rock – 492/100	Madrean Pine-Oak 441/100	Rx cut small d.b.h./Rx fire: 60 Rx fire, light: 381/100
	Mixed-Conifer 51	Rx cut small d.b.h./Rx fire: 51
Ski Valley – 452/100	Madrean Pine-Oak 119	Rx fire, light:119
	Ponderosa Pine 29	Rx cut small d.b.h./Rx fire: 12 Rx fire, light: 17 acres
	Mixed-Conifer 306/100	Rx cut small d.b.h./Rx fire: 112 Rx fire, light: 176/100 1 chain fuelbreak: 18
Loma Linda – 453/100	Madrean Pine-Oak 408/100	Rx cut small d.b.h./Rx fire: 128 Rx fire: 6 Rx fire, light: 274/100
	Mixed-Conifer 46	Rx cut small d.b.h./Rx fire: 14 Rx fire, light: 32
Red Ridge – 485/100	Madrean Pine-Oak 284/100	Rx cut small d.b.h./Rx fire: 169 Rx fire: 5 Rx-fire, light: 110/100
	Mixed-Conifer 201	Rx cut small d.b.h./Rx fire: 92 Rx fire, light: 109
Reef of Rock – 469/100	Madrean Pine-Oak 196/100	Rx cut small d.b.h./Rx fire: 61

Acres of Mexican Spotted Owl Protected Activity Centers/Core Areas	Acres of Vegetation Types Within Each Protected Activity Center/Core Area	Acres of Each Treatment Type Within Each Vegetation Type in Protected Activity Centers/Core Areas
		Rx fire, light: 135/100
	Mixed-Conifer 273	Rx cut small d.b.h./Rx fire: 81 Rx fire, light: 192
Crystal Spring – 436/100	Juniper-piñon woodland 76	Rx fire, light: 76
	Madrean Pine-Oak 320/83	Rx cut small d.b.h./Rx fire: 75 Rx fire, light: 245/83
	Mixed-Conifer 39/17	Rx cut small d.b.h./Rx fire: 15 Rx fire, light: 24/17
Bear Wallow – 439/100	Madrean Pine-Oak 74/87	Rx fire, light: 74/87
	Ponderosa Pine 166/13	Rx cut small d.b.h./Rx fire: 75 Rx fire, light:91/13 acres
	Mixed-Conifer 199	Rx cut small d.b.h./Rx fire: 186 Rx fire, light: 13
Butterfly Peak – 464/100	Juniper-piñon woodland 58	Rx fire: 58
	Madrean Pine-Oak 268/89	Rx fire: 219 Rx fire, light: 49/89
	Mixed-Conifer 138/12	Rx cut small d.b.h./Rx fire: 94 Rx fire, light: 44/12
Marshall Gulch – 448/100	Madrean Pine-Oak 190	Rx fire, light: 190
	Ponderosa Pine 193/8	Rx cut small d.b.h./Rx fire: 13 Rx fire, light: 180/8
	Mixed-Conifer 64/93	Rx cut small d.b.h./Rx fire: 7 Rx fire, light: 57/93
Upper Edgar Canyon – 475/100	Madrean Pine-Oak 440/100	Rx cut small d.b.h./Rx fire: 143 Rx fire: 7 Rx fire, light: 290/100
	Ponderosa Pine 21	Rx fire, light: 21
	Mixed-Conifer 14	Rx cut small d.b.h./Rx fire: 14
Novio Spring – 481/100	Madrean Pine-Oak 215/12	Rx cut small d.b.h./Rx fire: 10 Rx fire: 80 Rx fire, light:125/12
	Mixed-Conifer 265/88	Rx cut small d.b.h./Rx fire: 137 Rx fire, light: 128/88
Palisade Canyon – 382/100	Madrean Pine-Oak 283/100	Rx cut small d.b.h./Rx fire: 40 Rx fire, light: 243/100
	Ponderosa Pine 98	Rx cut small d.b.h./Rx fire: 98
Sollers – 464/100	Madrean Pine-Oak 37	Rx fire, light: 37
	Ponderosa Pine 427/100	Rx cut small d.b.h./Rx fire: 262 Rx fire, light: 165/100
	Mixed-Conifer 18	1 chain fuelbreak: 18
Barnum Rock – 461/100	Madrean Pine-Oak 411/100	Rx cut small d.b.h./Rx fire: 237 Rx fire, light: 174/100
	Ponderosa Pine 50	Rx cut small d.b.h./Rx fire: 50
Maverick – 458/100	Madrean Pine-Oak 458/100	Rx cut small d.b.h./Rx fire: 173 Rx fire: 17 Rx fire, light: 268/100
Bear Canyon – 451/100	Madrean Pine-Oak 450/100	Rx cut small d.b.h./Rx fire: 321 Rx fire: 25 Rx fire, light: 104/100
Cañada del Oro – 582/100	Madrean Pine-Oak 523/100	Rx cut small d.b.h./Rx fire: 347 Rx fire, light: 176/100
	Mixed-Conifer 59	Rx cut small d.b.h./Rx fire: 53 Rx fire, light: 6
Total 8,630/1,800	8,630/1,800	Rx cut small d.b.h./Rx fire: 3,177 Rx fire: 422 Rx fire, light: 4,995/1,800 1 chain fuelbreak: 36

Disturbance

All treatments and burning within PACs will occur outside of the Mexican spotted owl breeding season, and therefore nesting owls should not be disturbed by these activities. However, nesting owls may be disturbed by small crews of people conducting stand preparation activities (e.g., marking trees) and monitoring within and near the core area, and by fire and thinning treatments adjacent to owl PACs during the breeding season. Swarthout and Steidl (2001) found that Mexican spotted owls modified their behavior (e.g., increased perch height) and/or flushed in response to recreationists (hikers). Based on their results, they recommended placing buffer zones (conservative buffer = 180 feet; less conservative buffer = 40 feet) around known roosting sites to minimize impacts. In a study to assess the effects of hikers on the behavior of nesting Mexican spotted owls, Swarthout and Steidl (2003) noted that female owls decreased the amount of time they handled prey by 57% and decreased the amount of time they performed daytime maintenance activities by 30% while hikers were present. In addition, hikers caused both female and male owls to increase the frequency of contact vocalizations. Birds may respond to disturbance during the breeding season by abandoning their nests or young; by altering their behavior such that they are less attentive to the young, which increases the risk of the young being preyed upon or disrupting feeding patterns; or by exposing young to adverse environmental stress (Knight and Cole 1995). There is also evidence that disturbance during years of a diminished prey base can result in lost foraging time which, in turn, may cause some raptors to leave an area or not to breed at all (Knight and Cole 1995). Topographic screening between the area of disturbance and the bird's location creates a noise buffer, and may assist in the reduction of noise disturbance (Knight and Cole 1995).

Our analysis of the Catalina-Rincon Firescape action area and PAC location information indicates that even if actions do not occur within PACs during the breeding season, project-related noise adjacent to and within 0.25 mile of PACs and core areas could affect owls during the breeding season. Noise generated during thinning activities adjacent to PACs could result in disturbance to breeding owls, interfering with nesting and foraging activities pre- and post-fledging. Some PACs have topographic screening from adjacent thinning units (e.g., within a drainage, over a ridge, etc.), which could result in reduced noise impacts in some areas, but some Mexican spotted owls will experience greater noise and activity levels within the project area than they have likely experienced in the past. Conditions within PACs and treatments adjacent to and within PACs are described below in Summary of Effects to Mexican Spotted Owls and Habitat.

Burning in PACs will occur outside the Mexican spotted owl breeding season (during the period September 1 – February 28) and would include core areas, eliminating the need to build fire lines inside PACs. Disturbance caused by smoke created from burning adjacent to PACs may potentially affect Mexican spotted owls as it tends to settle into low-lying areas during the nighttime. Effects would be short-term (3 to 5 days), as all prescribed burns will be managed to produce low- to moderate-severity burns and must comply with Clean Air Act permits issued by the Arizona Department of Environmental Quality limiting the amount of smoke that may be

generated by prescribed burning. In addition, most of the PACs occur higher on the mountain top and we would expect smoke to settle out in many cases farther down the mountain or to be transported to the northwest as the prevailing winds are out of the southeast.
The CNF has included design features and conservation measures in the proposed action to reduce the effects of disturbance to Mexican spotted owls. For example, within PACs, mechanical thinning and fire treatments are limited to the nonbreeding season of September 1 – February 28 to minimize potential disturbance to owls during the breeding season. Additionally, resource advisors will be consulted when making decisions about prescribed fire activities, and fire staff will be informed of resource concerns and the reasoning for fire objectives in owl habitat. Also, prescribed fire and mechanical thinning treatments will be conducted to minimize effects on reproduction, including implementing fire tactics that keep fire severity low and limited to the understory with occasional single-tree torching in Mexican spotted owl PACs, and, where appropriate, igniting fires from the top of ridges, preferably at night or when the relative humidity is higher, to allow fire to back down into habitat to reduce fire intensity and severity. In addition, building fire line and/or congregating people and/or equipment within, or conducting flights over, PACs will be avoided. Given these design features and conservation measures, we expect that disturbance to Mexican spotted owls will be minimized to the extent possible, although some disturbance may still result.

Mechanical Thinning and Prescribed Burning

Under the proposed action, prescribed thinning and burning treatments would occur in PACs (3,177 and 10,430 acres, respectively) and recovery habitat (5,987 and 31,189 acres, respectively, inclusive of PACs) (Tables 3 and 4). Treatments within each PAC are also described below in Summary of Effects to Mexican Spotted Owls and Habitat. Nest/roost replacement habitat has not yet been mapped, although areas have been targeted for this type of habitat north of Novio Spring and to the north of Mount Bigelow (just east of Westfal Knob). Only burning would occur in the core areas of PACs. These treatments would occur over the entire span of the project (through 2033), and will be designed to avoid bringing stand conditions below the minimum desired conditions described in Table C.3 of the Recovery Plan (USFWS 2012a). A monitoring plan will be developed and implemented to reduce the effects that may occur to Mexican spotted owls through project implementation. The monitoring plan and results will be shared with the U.S. Fish and Wildlife Service.

Table 4. Ecological units comprising Mexican spotted owl recovery habitat in the Catalina-Rincon Firescape project area. The mixed conifer and ponderosa pine vegetation types comprise the nest/roost replacement habitat within owl recovery habitat. See the Proposed Action for a description of each treatment.

Ecological Unit and Treatment	**Acres**
Madrean pine-oak forest/woodland on mountains derived from granite, gneiss, and similar rocks	**22,839.04**
300' fuelwood	60.31
Rx fire	16,919.30
Rx fire, light	3,595.17
Rx cut/Rx fire	847.19
Rx cut small d.b.h./Rx fire	1,417.07

Madrean pine-oak forest/woodland on mountains derived mostly from metasedimentary rocks	**2,878.19**
Rx fire	1,788.16
Rx fire, light	774.83
Rx cut/Rx fire	2.83
Rx cut small d.b.h./Rx fire	312.37
Mixed conifer forest on mountains derived mostly from metasedimentary rocks	**2,770.43**
1 Chain Fuel Break	26.79
Rx fire	108.10
Rx fire, light	1,213.84
Rx cut/Rx fire	413.33
Rx cut small d.b.h./Rx fire	1,008.37
Ponderosa pine forest on hills and mountains derived from granite, gneiss, and similar rocks	**2,702.03**
Rx fire	63.54
Rx fire, light	652.88
Rx cut/Rx fire	1,447.27
Rx cut small d.b.h./Rx fire	538.33
TOTAL	31,189.68

Direct and indirect effects from the thinning actions within the PACs and recovery habitat should be short-term in terms of loss of key habitat components. Over the long-term, we expect these actions to maintain and/or enhance desirable habitat components such as large trees, large snags and logs, and at least 40% canopy cover. We do expect adverse effects to occur to habitat from implementation of the proposed action as structure and composition of the forest is modified within nest/roost habitat and across the landscape in recovery habitat. These effects are likely to be most noticeable over the life of this BO (through 2033). However, we do not know how treatments that increase openings, modify patch size and location, and create other landscape level changes will influence owl use (foraging and dispersal as well as nesting and roosting) of the action area over this period of time. The monitoring plan to be developed by the CNF in conjunction with USFWS should provide information on how the treatments affect owl occupancy during the life of this project in several PACs. We expect the results of this monitoring effort to inform this and future projects.

Prescribed fire, the deliberate application of fire to reduce forest fuels and reestablish fire as a process, is also part of the proposed action. Effects from prescribed burning in recovery and PAC habitats are difficult to quantify due to the uncertainty inherent in prescribed fire. Design features are in place to minimize the loss or modification of large trees, snags, and logs during all prescribed burning treatments. However, in the process of applying fire deliberately to the landscape, research in other national forests and public lands in Arizona and the Southwest has shown that large logs, snags, large trees, and Gambel oaks—all key habitat components of Mexican spotted owl habitat—may be lost or damaged during these activities (Horton and Mannan 1988).

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

- Twenty-one percent of all snags monitored were consumed by fire or converted to logs and the range of loss across sites was 12 to 38%. Nine snags were also created by fire: six of these were old-growth trees that were converted from live to dead trees and two were Gambel oaks.

- Fifty-three percent of all logs monitored were consumed by fire (lost). Log loss did not differ by species.

- Six percent of the 282 Gambel oaks greater than ten inches d.b.h. were lost, and loss ranged from 0 to 9% across the five sites.

- Old growth tree loss across the sites ranged from 0 to 6%.

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

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

- Overall tree densities were also significantly reduced after fire treatments. However, the greatest reduction in tree densities was in the smallest size classes (< 3 inches d.b.h. and ≥3 to <9 inches d.b.h.), with little change in larger (≥9 inches d.b.h.) 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 d.b.h.) densities changed relatively little.

- Smaller snag (<9 inches d.b.h.) densities increased 30 to 60%. With time, these dead trees could contribute to increased risk of spot fires.

In summary, prescribed burning is expected to reduce the risk of wildfire by reducing accumulations of fuels, but it will also modify and/or result in the loss of the key habitat components that comprise Mexican spotted owl habitat, both in recovery habitat and within PACs. Design features/conservation measures will be implemented in an attempt to minimize

these losses, but it is difficult to reduce and protect fuels on the same piece of ground. Based upon the area proposed for burning each year, and because the intention is to apply prescribed fire to all PACs, nest/roost replacement habitat, and recovery habitat, we think that there is a likelihood that key habitat components will be unintentionally lost to fire and that this could result in short-term adverse effects to Mexican spotted owls.

Prescribed burning will occur in all 18 PACs (10,430 acres) within the action area. Additionally, thinning will occur on 3,177 acres within PACs, but not within core areas. Activities within PACs will occur outside the breeding season. All 18 PACs may have burning activities adjacent to their boundaries at any time of year (including the breeding season). We do not expect that burning next to a PAC will disturb owls, as no mechanical noise will be occurring during burns and smoke effects will be short-term (3-5 days). However, 16 PACs may have thinning or fuelwood activities adjacent to or within 0.25 mile of their boundaries at any time of year. Of these, 14 have core areas that are within 0.25 mile of this mechanical disturbance. Conditions within PACs and treatments adjacent to and within PACs are described below, organized by the CNF's proposed priority treatment schedule **(note that we are including PACs proposed for treatment after 2033 in our analysis; if all PACs are not treated by 2033, the Forest Service may reinitiate consultation).**

PACs proposed to be treated between 2016 and 2022

Forty-six percent of the Bear Wallow PAC was previously burned, including 43% of its core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along portions of the boundary (<50%) of this PAC at any time of year, including portions of the core area that are within 0.25 mile of this activity. Most of this PAC, including the core area, sits atop a peak. Outside of the breeding season (and not including the core area), 261 (48%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-four percent of the Marshall Gulch PAC was previously burned, including 90% of its core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along a small portion of the boundary (<10%) of this PAC at any time of year, including a small portion of the core area that is within 0.25 mile of this activity. Most of this PAC, including the core area, sits atop a peak. Outside of the breeding season (and not including the core area), 20 (4%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-one percent of the Novio Spring PAC was previously burned, including 100% of its core area, mostly by low- and high-severity fire (Table 2). Thinning may occur along portions of the boundary (<25%) of this PAC at any time of year, including within 0.25 mile of two portions of the core area. The majority of this PAC is on the other side of a ridge from where thinning will occur, including the core area, which is also downslope of these treated areas. Outside of the breeding season (and not including the core area), 147 (25%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Eighty-eight percent of the Ski Valley PAC was previously burned, including 63% of its core area, by a mix of low- to high-severity fire (Table 2). Thinning may occur along portions of the boundary (<50%) of this PAC at any time of year, including adjacent to a large portion of the

core area. This PAC encompasses several ridgelines, and the core area is upslope from where the thinning activity will occur. Outside of the breeding season (and not including the core area), 124 (22%) acres of the PAC are proposed for small d.b.h. thinning and 18 (3%) acres for fuelbreak (Table 3).

PACs proposed to be treated between 2020 and 2030

Sixty-three percent of the Bear Canyon PAC was previously burned, including 99% of its core area, by a mix of low- to high-severity fire (Table 2). This PAC is within 0.25 mile of 300' fuelwood activities that may occur at any time of year along Mt. Lemmon Highway, including a portion of its core area. The core area is downslope of the area that will be treated by fuelwood activities. Thinning may occur along a portion of the PAC boundary (<25%), including some areas that are upslope of this activity. The core area is more than 0.6 mile away from this thinning activity. Outside of the breeding season (and not including the core area), 321 (58%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-eight percent of the Butterfly Peak PAC was previously burned, including 99% of its core area, by low- and high-severity fire (Table 2). Thinning may occur along small portions of the boundary (<10%) of this PAC at any time of year, including a small portion of the core area that is within 0.25 mile of this activity. Most of this PAC is downslope of the thinning areas, and the core area is on the other side of a ridge from this activity. Outside of the breeding season (and not including the core area), 94 (17%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-five percent of the Lemmon Rock PAC was previously burned, including 95% of the core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along a portion of the boundary (<25%) of this PAC at any time of year. The core area of this PAC is not within 0.25 mile of these activities, and the majority of the PAC is on the other side of ridgelines and downslope from where the thinning activities will occur. Outside of the breeding season (and not including core areas), 111 acres (19%) of the PAC is proposed for small d.b.h. thinning (Table 3).

Ninety-six percent of the Loma Linda PAC was previously burned, including 100% of its core area, predominantly by high-severity fire (Table 2). Thinning may occur along portions of the boundary (<50%) of this PAC at any time of year, including portions of the core area that are within 0.25 mile of this activity. The majority of this PAC is on the other side of a ridge from where thinning will occur, including the core area, which is downslope of these treated areas. A small portion of the PAC boundary (<10%) is on the same side and upslope of a thinning treatment. Outside of the breeding season (and not including the core area), 142 (26%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Seventy-seven percent of the Palisade Canyon PAC was previously burned, including 96% of its core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along much of the boundary (<75%) of this PAC at any time of year, including within 0.25 mile of a small portion of the core area. This PAC is located in Palisade Canyon, meaning most of the thinning activity will occur uphill and on the other sides of ridges surrounding the PAC, including the

core area. Outside of the breeding season (and not including the core area), 138 (29%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-nine percent of the Red Ridge PAC was previously burned, including 100% of its core area, by a mix of low- to high-severity fire (mainly high-severity; Table 2). Thinning may occur along a portion of the boundary (<25%) of this PAC at any time of year, including a small portion of the core area that is within 0.25 mile of this activity. The majority of this PAC is on the other side of a ridge from where thinning will occur, including the core area, which is also downslope of these treated areas. Outside of the breeding season (and not including the core area), 261 (45%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Eighty-six percent of the Sollers PAC was previously burned, including 99% of its core area, by a mix of low- to high-severity fire (Table 2). Thinning may occur along much of the boundary (<75%) of this PAC at any time of year, including within 0.25 mile of a portion of the core area. The majority of this PAC is on the other side of ridges or downslope from where thinning will occur, including the core area. Outside of the breeding season (and not including the core area), 262 (46%) acres of the PAC are proposed for small d.b.h. thinning and 18 (3%) acres for fuelbreak (Table 3).

PACs proposed to be treated between 2026 and 2033

Ninety-nine percent of the Barnum Rock PAC was previously burned, including 100% of its core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along portions of the boundary (<25%) of this PAC at any time of year, including within 0.25 mile of the core area. This PAC consists of peaks and valleys, a small portion of which are upslope of thinning activities. The core area of this PAC is mostly on the other side of a ridge from these activities, although there is a small portion on the same side of the ridge. Outside of the breeding season (and not including the core area), 287 (51%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-nine percent of the Cañada del Oro PAC was previously burned, including 100% of the core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along small portions (<10%) of the Cañada del Oro PAC at any time of year. The core area of this PAC is not within 0.25 mile of these activities, and the majority of the PAC is on the other side of ridgelines and downslope from where the thinning activities will occur. Outside of the breeding season (and not including core areas), 400 acres (59%) of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-six percent of the Crystal Spring PAC was previously burned, including 100% of its core area, by a mix of low- and high-severity fire (Table 2). Thinning may occur along portions of the boundary (<50%) of this PAC at any time of year, including within 0.25 mile of two portions of the core area. The majority of this PAC is on the other side of a ridge from where thinning will occur, including the core area, which is also downslope of these treated areas. Outside of the breeding season (and not including the core area), 90 (17%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-nine percent of the Upper Edgar Canyon PAC was previously burned, including 100% of its core area, mostly by low- to moderate-severity fire (Table 2). Thinning may occur along a portion of the boundary (<25%) of this PAC at any time of year, including within 0.25 mile of the core area. The majority of this PAC is on the other side of a ridge from where thinning will occur, and the core area is downslope of these treated areas and is surrounded by several ridges. Outside of the breeding season (and not including the core area), 157 (27%) acres of the PAC are proposed for small d.b.h. thinning (Table 3).

One hundred percent of the Reef of Rock PAC was previously burned, including 100% of its core area, by a mix of low- to high-severity fire (Table 2). Thinning may occur along a portion of the boundary (<25%) of this PAC at any time of year, including a small portion of the core area that is within 0.25 mile of this activity. The majority of this PAC is on the other side of a ridge from where thinning will occur, including the core area, which is downslope of these treated areas. Outside of the breeding season (and not including the core area), 142 (25%) acres of the PAC are proposed for small d.b.h. thinning (Table 3) between 2026 and 2033.

PACs proposed to be treated after 2033

Ninety-nine percent of the Maverick PACs was previously burned, including 100% of its core area, mostly by low- to moderate-severity fire (Table 2). No thinning will occur adjacent to or within 0.25 mile of the PAC or core area during the breeding season. Outside of the breeding season (and not including core areas), 173 acres (31%) of the PAC are proposed for small d.b.h. thinning (Table 3).

Ninety-nine percent of the Shovel Spring PAC was previously burned, including 100% of its core area, mostly by low- to moderate-severity fire (Table 2). No thinning will occur adjacent to or within 0.25 mile of the PAC or core area during the breeding season. Outside of the breeding season (and not including core areas), 219 acres (27%) of each PAC, respectively, are proposed for small d.b.h. thinning (Table 3).

The Green Mountain site has not been designated as a PAC, but has been occupied by Mexican spotted owls during the past two survey seasons (see Table 1). No treatments under the proposed action are proposed for the Green Mountain site. We recommend that the FS work towards designating this area as a PAC, but the proposed action will have no effect on this site.

Summary of effects to Mexican Spotted Owl

In summary, Mexican spotted owls associated with 7 of the 18 PACs within the action area are not likely to be significantly impacted by the proposed action due to: 1) the distance (>0.25 mile) of the PAC or core area from thinning treatments that may occur during the breeding season, 2) the small area being treated close to the PAC (≤25% of the perimeter) during the breeding season, 3) topographic screening (within a drainage, over a ridge) from thinning treatments during the breeding season, and 4) the relatively small amount of habitat (≤25%) being thinned within the PAC (outside of the breeding season). Individuals associated with one PAC may be disturbed due to the lack of topographic screening between the PAC (including the core area) and the thinning treatments. Individuals associated with nine PACs may be disturbed due to the

relatively higher amount of habitat (>25%) being treated within the PAC. Individuals associated with one PAC may be disturbed due to both lack of topographic screening and a higher amount of treated area within the PAC.

For these reasons, temporary impacts to Mexican spotted owl reproduction, numbers, and distribution within the Santa Catalina Mountains are expected as a result of the proposed action due to disturbance. However, the proposed action is not expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of Mexican spotted owls relative to the BRW, and, ultimately, will improve forest health and reduce the likelihood of high-severity fire, which is the primary threat to spotted owl habitat in the Santa Catalina Mountains. Monitoring of Mexican spotted owls and implementing adaptive management will provide a further check on potential adverse effects, as changes to the proposed action based on the annual review of this monitoring will be incorporated into treatment design.

Critical Habitat Effects

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all designated critical habitat units, and the PCEs of those units, to determine the overall ability of all designated critical habitat to support recovery. Further, the functional role of each of the critical habitat units in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

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

<u>Primary Constituent Elements related to forest structure:</u>

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 d.b.h. of 12 inches or more.

Effect: Actions implemented under the proposed action are expected to retain the range of tree species (i.e., conifers and hardwoods associated with Mexican spotted owl habitat) and would not reduce the range of tree sizes needed to create the diverse forest and multi-layered forest canopy preferred by owls. Some loss of trees of all types and d.b.h. size classes may occur from prescribed fire and forest thinning treatments. However, the range of tree species and sizes needed to maintain this PCE in PACs and recovery habitat across the CNF is expected to be maintained because the CNF is implementing design features and conservation measures that strive to retain large trees, canopy cover appropriate for owl habitat, and a diverse range of tree

species. Therefore, the function and conservation role of this PCE would not be compromised by the proposed action.

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

Effect: We expect that tree shade canopy may be reduced following thinning and burning treatments implemented under the proposed action. However, we do not expect reduction of canopy cover in Mexican spotted owl forested habitat to be reduced below 40 percent because the CNF has adopted the Recovery Plan recommendations that include managing for higher basal area and increased canopy cover in Mexican spotted owl habitat versus pure ponderosa pine or other forest and woodland habitats. We would expect that some small reduction in existing canopy cover (5 to 10 percent) may actually aid in increasing understory herbaceous vegetation and forb production, which could benefit Mexican spotted owl prey species. The function and conservation role of this PCE would not be compromised by the proposed action.

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

Effect: Large snags may be reduced following proposed prescribed burning and thinning treatments implemented under the proposed action. Currently, large snags are rare across the action area, and any loss of this habitat component may be significant in terms of maintaining Mexican spotted owl and prey habitat. Some snags would be created through prescribed burning, which could benefit the Mexican spotted owl. However, snags currently used by Mexican spotted owls for nesting are typically very old, large d.b.h., highly decayed snags with cavities. In individual burning projects, the CNF would attempt to minimize loss of these large snags by implementing only light prescribed fire in core areas. Research has indicated that following burning treatments, upwards of 30 percent of these existing snags may be lost within treated (i.e., burned) forests, resulting in short-term adverse effects to this PCE (Randall-Parker and Miller 2000). However, the study design did not include active protective measures for large snags. Conservation measures and design features that the CNF can implement to protect the largest and oldest snags (particularly those with nest cavities) are and will be very important. Therefore, though we anticipate there may be a measurable loss of snags due to implementation of this project, efforts to protect this rare resource would be made as part of the prescribed burn planning process. As such, the function and conservation role of this PCE would not be compromised by the proposed action.

Primary Constituent Elements related to maintenance of adequate prey species:

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

Effect: Fallen trees and woody debris would likely be reduced by the proposed prescribed burning and thinning treatments. Logs are expected to be reduced by approximately 30 percent within Mexican spotted owl PACs and recovery habitat (Randall-Parker and Miller 2000). This loss of large logs would result in short-term adverse effects to this primary constituent element and could result in localized impacts to prey species habitat. Furthermore, across the CNF, it is likely that hazard tree removal and prescribed burning would also create fallen trees and woody debris as trees are felled (i.e., cut) and left on the ground or are killed post-burn and fall.

However, based upon current data for many of these areas, there is an excess supply of coarse woody debris due to the exclusion of frequent, low-severity fire, which can increase the likelihood of high-severity fire within recovery habitat. Therefore, some removal of woody debris would result in an overall benefit to the function and conservation role of this PCE, though short-term adverse effects would likely occur within some project areas.

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

Effect: We expect this PCE would be positively affected by the actions taken under the proposed action. Plant species richness would increase following thinning and/or burning treatments that result in small, localized canopy gaps. Design features and conservation measures focus on retaining oaks and other hardwoods, although some level of short-term loss could occur. However, the function and conservation role of this PCE would not be compromised by the proposed action.

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

Effect: Short-term decreases in plant cover would result from prescribed burning activities. We expect long-term increases in residual plant cover because fire treatments would provide conditions suitable for increased herbaceous plant growth by removing a thick layer of dead plant debris within treated areas. The mosaic effect created by burned and unburned areas and by opening up small patches of forest within protected habitat is also expected to increase herbaceous plant species diversity (Jameson 1967, Moore et al. 1999, Springer et al. 2001) and, in turn, assist in the production and maintenance of the Mexican spotted owl prey base. The combination of low-intensity prescribed burns and thinning during the proposed action would most likely result in only short-term effects to the Mexican spotted owls with regard to modifying prey habitat within treatment areas. In frequent-fire landscapes, herbaceous understory response and plant regeneration tends to be positive following tree removal and prescribed fire (Springer et al. 2001). Therefore, the function and conservation role of this PCE across the CNF would not be compromised by the proposed action.

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

Adverse effects and associated incidental take from the Catalina-Rincon Firescape Project are not expected to negatively affect Mexican spotted owl recovery and/or further diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl.

The proposed action includes conservation measures and design features (Appendix C) to integrate habitat management objectives and species protection measures in accordance with the Recovery Plan (USFWS 2012a). Designated critical habitat includes all protected (PACs) and recovery habitat (unoccupied Mexican spotted owl habitat) within critical habitat units. The proposed project should increase the sustainability and resiliency of Mexican spotted owl habitat; therefore, implementation of the Catalina-Rincon Firescape Project is not expected to further diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl.

These actions include the following:

- The CNF within the project area has and continues to designate PACs surrounding known Mexican spotted owl nesting and roosting sites. PACs are established around owl sites and are intended to protect and maintain occupied nest/roost habitat. Nesting and roosting habitat is rare across the range of the Mexican spotted owl, and by identifying these areas, which are also critical habitat, for increased protection, the CNF is aiding in recovery.

- Within the action area, the CNF has identified and is managing mixed conifer and ponderosa pine-oak forests that have potential for becoming Mexican spotted owl recovery nest/roost replacement habitat, or are currently providing habitat for foraging, dispersal, or wintering habitats. Nesting and roosting habitat is a limiting factor for the owl throughout its range. By managing critical habitat for future nest/roost replacement habitat, the CNF is aiding in recovery.

- The CNF's intent is to integrate the best available recovery habitat management objectives where possible into the proposed treatments with the overall goal to protect owl PACs from high-severity wildland fire and to conduct actions to improve forest sustainability (e.g., thinning and prescribed burning). This management will ensure that Mexican spotted owl habitat continues to exist on the forest and that critical habitat will continue to retain its function for conservation and recovery of the owl. In addition, the CNF will monitor the proposed action, which will aid us in learning how to conduct thinning and burning activities in PACs.

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

Cumulative Effects

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

Climate change, in combination with drought cycles, is likely to exacerbate existing threats to the owl's habitats in the southwestern United States, now and into the foreseeable future. Increased and prolonged drought associated with changing climatic patterns will result in continued warming and drying of forested habitats, will likely alter vegetation structure and composition, and will 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 proposed action should help to mitigate some of the long-term effects of climate change on Mexican spotted owl habitat.

The CNF manages almost all lands within the action area and administers projects and permits on those lands; thus, almost all activities that could potentially affect the Mexican spotted owl are Federal activities and subject to additional section 7 consultation under the Act. The exceptions are unregulated activities on Federal and non-Federal lands, such as trespass livestock and inappropriate use of OHVs, which can adversely affect the species through disturbance, trampling of vegetation, and erosion.

Conclusion

After reviewing the current status of the Mexican spotted owl, the environmental baseline for the action area, the effects of the proposed Catalina-Rincon Firescape Project, and the cumulative effects, it is our BO that the Catalina-Rincon Firescape Project, as proposed, is not likely to jeopardize the continued existence of the Mexican spotted owl. We base this conclusion on the following:

1. The Catalina-Rincon Firescape Project will strive to implement the Recovery Plan (USFWS 2012a) and manage for Mexican spotted owl recovery in the Santa Catalina Mountains.
2. Desired conditions and guidelines in the Catalina-Rincon Firescape Project recognize the need to reduce the potential for landscape level, stand-replacing fire in 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.
3. Based on the discussion provided in the Effects to Mexican Spotted Owl Critical Habitat section above, the CHU (BR-W-11) affected by the Catalina-Rincon Firescape Project will continue to serve the function and conservation role of critical habitat for the Mexican spotted owl.

The conclusions of this BO are based on full implementation of the project as described in the **DESCRIPTION OF THE PROPOSED ACTION** section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

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

provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued to an applicant, 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, as appropriate, 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 USFWS as specified in the incidental take statement. [50 CFR § 402.14(i)(3)].

Amount of Extent of Take

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 even 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: (l) 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.

Based upon analyses of the effects of Forest Service projects within previous forest restoration projects BOs, we anticipate the majority of incidental take for actions implemented under the Catalina-Rincon Firescape proposed action will be in the form of short-term harassment. Owls experiencing short-term harassment may fail to successfully rear young in one or more breeding seasons, but will not likely desert the area because of a short-term disturbance (Delaney et al.

1999); harassment is measured as owls taken associated with a specific number of PACs. Incidental take in the form of harm is not anticipated.

There are 18 PACs that could be affected by the Catalina-Rincon Firescape Project. All PACs include acres that the Forest Service will thin and prescribe burn.

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 Catalina-Rincon Firescape 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 that have yet to be implemented:

Bear Wallow PAC – Prescribed burning and thinning will occur within this PAC. Burning is not anticipated to result in take. In addition, thinning may occur adjacent to this PAC along a good portion of boundary of this PAC, including portions that are within 0.25 miles of the core area. However, while we expect that owls can occupy this PAC at some future point, currently, the PAC has not been occupied during the past two seasons and was last documented as being occupied in 2006. This PAC is scheduled for first round of treatment which reduces the likelihood of occupancy during treatment based on the occupancy history of this PAC. Therefore, we do not anticipate that the proposed action will result in incidental take of owls associated with this PAC.

Marshall Gulch PAC – Prescribed burning and thinning will occur within the PAC, but only a small portion of the boundary of this PAC will be affected by thinning outside of the PAC. Although over 90% of this PAC has been affected by past fires, the PAC has been consistently occupied and produced young. However, the proposed treatment will occur in only 4% of the PAC area reducing the likelihood of effects. Therefore, we do not anticipate that the proposed action will result in incidental take of owls associated with this PAC.

Novio Spring PAC – Prescribed burning and thinning will occur within the PAC. Because past fires have burned most of this PAC, including 100% of the core area, there is likely to be heavy fuel loading of dead and downed timber. It is possible because of the high fuel loads that prescribed fire may not be able to be kept within prescription resulting in a higher intensity burn, which could alter habitat components and result in take in the form of harassment. We do not expect that take will occur due to disturbance or habitat alteration due to thinning. However, we do expect that habitat alteration could occur as a result of the current conditions within this PAC; therefore, we think that incidental take of owls associated with this PAC could occur due to the probability of increased fire behavior during prescribed burning.

Ski Valley PAC – Prescribed burning and thinning will occur within this PAC. However, burning is not anticipated to result in incidental take of owls associated with this PAC. Thinning activities will occur adjacent to the PAC along approximately 50% of the boundary of the PAC and could occur during any time of the year. This disturbance, in addition to other human disturbance in this high-use area, could result in take of the PAC in the form of harassment. We do not expect that the proposed thinning within the PAC will result in incidental take of the owls

associated with this PAC due to its limited extent. We anticipate that incidental take of owls associated with this PAC could occur due to disturbance.

Bear Canyon PAC – Prescribed burning and thinning will occur within the PAC. However, burning is not anticipated to result in incidental take of owls associated with this PAC. While some thinning will occur within the PAC, most of it will occur over a half mile from the core area. While we anticipate that this PAC could be occupied by owls at some future point, this PAC was not occupied during the two most recent surveys, nor has there been documented occupancy in over 10 years. Therefore, we do not anticipate incidental take of owls associated with this PAC as a result of the proposed action.

Butterfly Peak PAC – Prescribed burning and thinning will occur within the PAC. Because of the high percentage of this PAC that was burned during past fires, we expect high fuel loads of dead and downed timber and anticipate that prescribed burns in this PAC could burn at higher intensities that the prescription. This could result in alterations of habitat resulting in take of this PAC due to harassment. We do not expect incidental take of owls associated with this PAC due to thinning activities within and adjacent to the PAC due to the limited extent of these activities. We anticipate incidental take of owls associated with this PAC from harassment due to the potential for a higher intensity burn.

Lemmon Rock PAC – Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of owls associated with this PAC due to burning. While thinning activities will occur within and adjacent to this PAC, we do not expect take to occur from this activity due to the limited extent of the activity and topography within the PAC reducing the potential for disturbance. We do not anticipate incidental take of owls associated with this PAC as a result of the proposed action.

Loma Linda PAC – Prescribed burning and thinning will occur within the PAC. Because most of this PAC was affected by past high-severity burn, we anticipate that prescribed burning within this PAC may burn at a higher severity than prescription resulting in the potential for take due to harassment. In addition, due to the extent of habitat impacted by the burn, we also anticipate that the extent of thinning within the PAC may result in altered habitat conditions. While thinning activities adjacent to the PAC will take place along greater than 50% of the PAC boundary at any time of the year, we do not expect that disturbance will rise to the level of take due to topography in the area that should provide screening to the core area, thus protecting the owls from increased noise disturbance during the breeding season. We anticipate incidental take of the owls associated with this PAC as a result of habitat alteration from burning and thinning.

Palisade Canyon PAC – Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect incidental take of the owls associated with this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to topography and the limited extent of the thinning activities. In addition, while we do expect that this PAC could be occupied at some future point, current occupancy patterns indicate that this PAC has not been occupied for over 10 years. We do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

Red Ridge PAC – Prescribed burning and thinning will occur within the PAC. Because most of this PAC was affected by past high-severity burn, we anticipate that prescribed burning within this PAC may burn at a higher severity than prescription resulting in the potential for take due to harassment. In addition, due to the extent of habitat impacted by the burn, we also anticipate that the extent of thinning within the PAC may result in altered habitat conditions. While thinning activities adjacent to the PAC will take place along the PAC boundary at any time of the year, we do not expect that disturbance will rise to the level of take due to the limited extent of this activity. We anticipate incidental take of the owls associated with this PAC as a result of habitat alteration from burning and thinning.

Sollers PAC - Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect incidental take of the owls associated with this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to topography and the limited extent of the thinning activities. In addition, while we do expect that this PAC could be occupied at some future point, current occupancy patterns indicate that this PAC has not been occupied for over 10 years. We do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

Barnum Rock PAC - Prescribed burning and thinning will occur within the PAC. Although most of this PAC was affected by past fire, the fire burned at low to moderate severity. We do not expect that take of this PAC will occur as a result of prescribed burning. However, due to the extent of habitat impacted by the past burn and also the extent of the proposed thinning within this PAC, we do anticipate that the extent of thinning within the PAC may alter habitat conditions resulting in take from harassment. While thinning activities adjacent to the PAC will take place along the PAC boundary at any time of the year, we do not expect that disturbance will rise to the level of take due to the limited extent of this activity. We anticipate take of this PAC as a result of habitat alteration from thinning.

Cañada Del Oro PAC - Prescribed burning and thinning will occur within the PAC. Although most of this PAC was affected by past fire, the fire burned at low to moderate severity. We do not expect that incidental take of the owls associated with this PAC will occur as a result of prescribed burning. However, due to the extent of habitat impacted by the past burn and also the extent of the proposed thinning within this PAC, we do anticipate that the extent of thinning within the PAC may alter habitat conditions resulting in take from harassment. While thinning activities adjacent to the PAC will take place along the PAC boundary at any time of the year, we do not expect that disturbance will rise to the level of take due to the limited extent of this activity. We anticipate incidental take of the owls associated with this PAC as a result of habitat alteration from thinning.

Crystal Spring PAC - Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect take of this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to topography and the limited extent

of the thinning activities. Therefore, we do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

Upper Edgar Canyon PAC - Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect take of this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to topography and the limited extent of the thinning activities. Therefore, we do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

Reef of the Rock PAC - Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect incidental take of the owls associated with this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to topography and the limited extent of the thinning activities. Therefore, we do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

Maverick PAC - Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect incidental take of the owls associated with this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to the limited extent of the thinning activities. Therefore, we do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

Shovel Spring PAC - Prescribed burning and thinning will occur within the PAC. We do not anticipate incidental take of the owls associated with this PAC due to prescribed burning. We also do not expect incidental take of the owls associated with this PAC due to disturbance from adjacent thinning activities during any time of the year nor from thinning within the PAC due to the limited extent of the thinning activities. Therefore, we do not anticipate incidental take of the owls associated with this PAC as a result of the proposed action.

In summary, we anticipate incidental take of owls associated with six PACS in the form of short-term harassment as a result of the proposed action and it is that level of anticipated incidental take that is authorized under this consultation. Although we have described take based on conditions of the individual PACs, because we cannot predict what the actual conditions will be within individual PACS at the time of treatment, the anticipated incidental take is not assigned to individual PACS, but rather the incidental take of owls associated with six PACS overall as a result of implementation of the proposed action. In other words, incidental take can occur in any of the identified PACs within which treatment will occur, but once incidental take from harassment has occurred in six PACs, anything beyond that will exceed the take allowed under this consultation.

Effect of the Take

In this BO, the USFWS 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. We have based this determination on the number of PACs with anticipated take from mechanical thinning and burning projects to be implemented under Catalina-Rincon Firescape Project that could have short-term adverse effects, but long-term benefits, to the Mexican spotted owl.

Reasonable and Prudent Measures

Section 7 requires minimization of the level of take (USFWS and NMFS 1998). It is not appropriate to require mitigation for the impacts of incidental take. Reasonable and prudent measures can include only actions that occur within the action area, involve only minor changes to the project, and reduce the level of take associated with project activities. These measures should minimize the impacts of incidental take to the extent reasonable and prudent. For example, a measure may call for actions like education of employees about the species, reduction of predation, removal or avoidance of the species, or monitoring. Measures are considered reasonable and prudent when they are consistent with the proposed action's basic design (e.g., narrowing of disturbed right-of-way at known species locations), location (e.g., temporary storage of equipment or other materials), scope, duration, and timing. The test for reasonableness is whether the proposed measure would cause more than a minor change to the project.

Reasonable and prudent measures and terms and conditions should be developed in coordination with the action agency and applicant, if any, to ensure that the measures are reasonable, that they cause only minor changes to the project, and that they are within the legal authority and jurisdiction of the agency or applicant to carry out (USFWS and NMFS 1998). For example, the effect of measures costing $10,000 or $100,000 may be critically significant for a single family boat dock, but minor for a multi-million dollar development complex. An example of an unreasonable measure would be a timing delay to minimize the impacts of incidental take if project timing is critical.

Reasonable and prudent measures serve to minimize impacts on the specific individuals or habitats affected by the action (USFWS and NMFS 1998). Activities resulting from these measures must occur within the action area, which may be larger than the footprint of the project itself (see description of action area in section 4.5(A)).

The following reasonable and prudent measures are necessary and appropriate to minimize take of Mexican spotted owls:

1. The CNF shall monitor incidental take resulting from the proposed action and report to the USFWS the findings of that monitoring.

2. Within six months of the date of this final BO, the CNF will submit a final map to the USFWS displaying Mexican spotted owl PACs, recovery habitat, and nest/roost replacement habitat (within recovery habitat).

Terms and Conditions

The terms and conditions set out the specific methods by which the reasonable and prudent measures are to be accomplished, e.g., who is to be educated, when/what/how; the actions necessary to reduce predation; who may remove or how to avoid the species; or the protocol for monitoring. Terms and conditions of an incidental take statement must include reporting and monitoring requirements that assure adequate action agency oversight of any incidental take [50 CFR §402.14(i)(1)(iv) and (i)(3)]. The monitoring must be sufficient to determine if the amount or extent of take is approached or exceeded, and the reporting must assure that the Services will know when that happens." (USFWS and NMFS 1998).

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

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

1.1 The CNF shall monitor the project area to ascertain whether PACs continue to be occupied following thinning and prescribed burning and/or loss of its habitat that causes harm or harassment to the species. To monitor habitat, it is expected the CNF may partner with the University of Arizona (UA) or other researchers to determine the effects of the proposed action. Regardless of other partners, the CNF will include the USFWS in the development of the habitat monitoring (including priority treatment schedule) to ensure that data collected is informative in terms of effects to the key habitat components of Mexican spotted owl habitat, particularly the persistence of large trees and canopy cover. To monitor Mexican spotted owls, the Mexican Spotted Owl Survey Protocol (Appendix D in USFWS 2012a) should be used to monitor occupancy and reproduction within PACs. PACs should be monitored prior to thinning and burning to determine occupancy prior to these actions, and for at least three consecutive years following thinning and burning.

1.2 The CNF shall submit annual monitoring reports to the Arizona Ecological Services (AESO) Office by December 1 beginning in 2018. These reports shall document for the previous calendar year the effectiveness of the terms and conditions and locations of listed species observed, and, if any are found dead, suspected cause of fatality. The report shall also summarize tasks accomplished under the proposed minimization measures and terms and conditions. The report shall include survey results for surveys conducted within PACs as outlined in the proposed action. The report shall make recommendations for modifying or refining these terms and conditions to enhance listed species protection.

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

2.1 In consultation with the USFWS, the CNF will determine where Mexican spotted owl recovery habitat and nest/roost replacement habitat exist within the action area over the six months following the date of the final BO for this project.

2.2 As part of this process, the CNF will work with the USFWS to increase the size of PACs within the action area that currently do not meet the minimum size requirement (600 acres), where possible and appropriate.

2.3 At the end of the six months, the CNF will submit a map and GIS files to the USFWS documenting designated Mexican spotted owl PACs, as well as areas to be managed as nest/roost replacement habitat and recovery habitat for the Mexican spotted owl.

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 CNF 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.

YELLOW-BILLED CUCKOO

Status of the Species and Critical Habitat

Legal Status

The western distinct population segment (DPS) of the yellow-billed cuckoo was listed as a threatened species under the ESA on October 3, 2014 (USFWS 2013, 2014b; 78 FR 61622, 79 FR 59992). Within the DPS (see Figure 1 at 79 FR 59994, in the final listing rule (79 FR 59992; October 3, 2014)), the habitat areas used by the species for nesting are located from southern British Columbia, Canada, to southern Sinaloa, Mexico, and may occur from sea level to 7,000 feet (ft) (2,154 meters (m)) in elevation (or slightly higher in western Colorado, Utah, and Wyoming). Critical habitat for the yellow-billed cuckoo DPS was proposed on August 15, encompassing 546,335 acres across the western United States (USFWS 2014a; 79 FR 48548).The discussions of the status of this species in these documents are incorporated herein by reference. A revised proposed rule that may include additional proposed critical habitat is under development.

Description

Adult yellow-billed cuckoos have moderate to heavy bills, somewhat elongated bodies and a narrow yellow ring of colored bare skin around the eye. The plumage is grayish-brown above and white below, with reddish primary flight feathers. The tail feathers are boldly patterned with

black and white below. They are medium-sized birds about 12 inches in length, and about 2 ounces in weight. Males and females differ slightly; the males have a slightly smaller body size, smaller bill, and the white portions of the tail tend to form distinct oval spots. In females the white spots are less distinct and tend to be connected (Hughes 1999).

Morphologically, the yellow-billed cuckoos throughout the western continental United States and Mexico are generally larger, with significantly longer wings, longer tails, and longer and deeper bills (Franzreb and Laymon 1993). Birds with these characteristics occupy the DPS and we refer to them as the "western yellow-billed cuckoo." Only the DPS was listed as a threatened species (USFWS 2014b). Yellow-billed cuckoos in the west arrive on the breeding grounds 4 to 8 weeks later than eastern yellow-billed cuckoos at similar latitude (Franzreb and Laymon 1993, Hughes 1999).

Distribution

The yellow-billed cuckoo is a member of the avian family Cuculidae and is a Neotropical migrant bird that winters in South America and breeds in North America. The breeding range of the entire species formerly included most of North America from southeastern and western Canada (southern Ontario and Quebec and southwestern British Colombia) to the Greater Antilles and northern Mexico (American Ornithologists Union (AOU) 1957, 1983, 1998).

Based on historical accounts, the western yellow-billed cuckoo was formerly widespread and locally common in California and Arizona, more narrowly distributed but locally common in New Mexico, Oregon, and Washington, and uncommon along the western front of the Rocky Mountains north to British Columbia (AOU 1998, Hughes 1999). The species may be extirpated from British Colombia, Washington, and Oregon (Hughes 1999). The western yellow-billed cuckoo is now very rare in scattered drainages in western Colorado, Idaho, Nevada, and Utah, with single, nonbreeding birds most likely to occur (USFWS 2013, 2014a, 2014b). The largest remaining breeding areas are in southern and central California, Arizona, along the Rio Grande in New Mexico, and in northwestern Mexico (USFWS 2014b).

In Arizona, the species was a common resident in the (chiefly lower) Sonoran zones of southern, central, and western Arizona (Phillips et al. 1964). The yellow-billed cuckoo now nests primarily in the central and southern parts of the state, as well as at revegetation sites along the lower Colorado River (MacFarland and Horst 2015; USFWS 2013, 2014a, 2014b, McNeil et al. 2013).

Yellow-billed cuckoos spend the winter in South America, east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Ehrlich et al. 1992, AOU 1998). Wintering yellow-billed cuckoos generally use woody lowland vegetation near fresh water. However, wintering habitat of the western yellow-billed cuckoo is poorly known.

Habitat

Breeding Habitat

The western yellow-billed cuckoo breeds in riparian (hydro- and xero- riparian) woodlands, and in Madrean evergreen woodland drainages and mesquite woodlands of arid areas. Habitat conditions are typically cooler and more humid than in the surrounding environment (USFWS 2014a,b). The vegetation making up the breeding habitat of the western yellow-billed cuckoo varies across the species' range and includes native and nonnative -riparian and upland nonriparian species including cottonwood (*Populus* spp.), willow (*Salix* spp.), mesquite (*Prosopis* spp.), box elder (*Acer negundo*), sycamore (*Platanus* spp.), ash (*Fraxinus* ssp.), walnut (*Juglans* spp.), alder (*Alnus* spp.), hackberry (*Celtis spp.*), soapberry (*Sapindus saponaria*), oak (*Quercus* spp.), acacia (*Acacia* spp.), desert willow (*Chilopsis linearis*), elderberry (*Sambuccus mexicanus*), juniper (*Juniperus* spp.), pine (*Pinus* spp.), Russian olive (*Elaeagnus angustifolia*), and tamarisk (*Tamarix* spp.) (Gaines 1974, pp. 7–9; Gaines and Laymon 1984, pp. 59–66; Laymon and Halterman 1989, pp. 274–275; Dettling and Howell 2011, p. 28).

In most of the DPS, the western yellow-billed cuckoo primarily breeds in large riparian woodlands dominated by willow and cottonwood along low-gradient rivers and streams, and in open riverine valleys that provide wide floodplain conditions (USFWS 2014a,b). In the Southwest, however, cuckoos can also breed in higher gradient drainages, and narrower and drier reaches of riparian habitat (Corman and Magill 2000; WestLand Resources; Inc. 2013a, 2013b, 2015a, 2015b, 2015c; Arizona Game and Fish Department 2016; Cornell Lab of Ornithology 2017; MacFarland and Horst 2015, 2017; Tucson Audubon 2015). Large expanses of gallery riparian woodland habitat supports greater densities of cuckoos than less dense reaches of scattered riparian trees or more xero-riparian woodlands. However, these less dense reaches of scattered riparian trees and more xero-riparian woodlands are also important to yellow-billed cuckoos as nesting substrate, foraging habitat, and as a buffer between more hydric sites and the adjacent, xeric uplands (USFWS 2014a, 2014b; Griffin 2015; Groschupf 2015; McFarland and Horst 2015, 2017). To distinguish between the western yellow-billed cuckoo breeding habitat in riparian areas throughout the range and breeding habitat found in more arid areas of the Southwest, we use the terms "Rangewide" and "Southwestern" breeding habitat, respectively. We describe both the Rangewide and Southwestern breeding habitat below:

Rangewide breeding habitat

Rangewide breeding habitat (including in the Southwest) is generally, but not exclusively, comprised of mixed willow and cottonwood riparian woodlands with an overstory and understory vegetation component in contiguous or nearly contiguous patches. Rangewide breeding habitat is usually within floodplains or in upland areas or terraces adjacent to watercourses often greater than 325 ft (100 m) in width and 200 ac (81 ha) or more in extent (USFWS 2014a). The width of some patches may be less, depending on location and habitat conditions. The slope of the water courses within or adjacent to habitat patches is generally less than 3% but may be greater in some instances. The habitat patches are usually dominated by willow or cottonwood, but are sometimes dominated by other riparian species of similar structure (for example

boxelder). Habitat patches contain one or more nesting groves that have above average canopy closure (greater than 70%), and have a cooler, more humid environment than the surrounding riparian and otherwise arid upland habitats (Laymon and Halterman 1989, Hughes 1999). These features provide sites for breeding, nesting, sheltering, and foraging. Riparian breeding habitat in the Southwest ranges from the dense habitat described above to narrower and more sparsely vegetated habitat (described below).

Southwestern breeding habitat

Southwestern breeding habitat is located in the Southwestern United States (particularly in Arizona) and is comprised of riparian woodlands, mesquite woodlands, or Madrean evergreen woodlands with a variable overstory canopy and understory component within drainages at least 200 ac (81 ha) in size. In addition to cottonwood, willow, and mesquite, occupied riparian habitat in Arizona may also contain a greater proportion of xero-riparian species than in the rest of the DPS. Oak, hackberry, sycamore, walnut, ash, acacia, tamarisk, and juniper are among the most common xero-riparian species in Southwestern breeding habitat (Corman and Magill 2000, Corman and Wise-Gervais 2005, USFWS unpubl. data). Tamarisk may be a component of breeding habitat, but there is usually a native riparian tree component within the occupied habitat (Gaines and Laymon 1984, Johnson et al. 2008, McNeil et al. 2013, Sechrist et al. 2013, Carstensen et al. 2015). Habitat patches in the arid Southwest contain a greater proportion of xero-riparian and nonriparian tree species than elsewhere in the DPS. Habitat patches are often interspersed with large openings and include narrow stands of trees, small groves of trees, or sparsely scattered trees. As such, the canopy closure is variable, and where trees are sparsely scattered, canopy closure may be dense only at the nest tree. Southwestern breeding habitat types are as follows:

- Riparian woodland is more water-limited, contains a greater proportion of xero-riparian species, and is often narrower, patchier, and sparser than where water is more abundant. This more arid riparian woodland occurs in perennial and intermittent drainages and floodplains throughout the Southwest.
- Mesquite-dominated woodland habitat occurs in floodplains, adjacent terraces, and adjacent uplands in perennial, intermittent, and ephemeral drainages throughout the Southwest.
- Madrean evergreen woodland (usually oak-dominated) habitat occurs in intermittent and ephemeral drainages and adjacent hillsides in the foothills and mountains of southeastern Arizona, up to 7000 ft in elevation. The amount of oak varies and may be interspersed with mesquite and other species in Madrean evergreen woodland.

<u>Nest Site</u>

A large majority of nests are placed in willow trees, but cottonwood, mesquite, walnut, box elder, sycamore, hackberry, oak, alder, soapberry (*Sapindus saponaria*), seepwillow (*Baccharis glutinosa*), acacia, pecan (*Carya* sp.), prune (*Prunus domestica*), almond (*Prunus dulcis*) and tamarisk are also used (Laymon 1980, pp. 7–8; Kingsley 1982, p. 142; Groschupf 1987; Laymon

1998, p. 7; Hughes 1999, p. 13; Corman and Magill 2000, p. 16; Launer et al. 1990, p. 22; Halterman 2001, p. 11; Halterman 2002, p. 12; Halterman 2003, p. 11; Halterman 2004, p. 13; Corman and Wise-Gervais 2005, p. 202; Halterman 2005, p. 10; Halterman, 2006; Halterman 2007, p. 5; Holmes et al. 2008, p. 21; McNeil et al. 2013, pp. I-1 – I-3; Tucson Audubon 2015, p. 44; Groschupf 2015, *in litt*.; MacFarland and Horst 2015, pp. 9–12)). Cuckoos may also nest at more than one location in a year (USFWS 2014a,b). On the upper San Pedro River, many cuckoos renested following both successful and unsuccessful nesting attempts (Halterman 2009). These subsequent nests are sometimes hundreds of meters away from previous nests. Yellow-billed cuckoos at this site appear to be regularly double-brooded, and occasionally triple brooded, based on behavior and timing of nests. On the upper San Pedro River, cuckoos were not regularly detected on surveys until late June, and breeding in some years did not begin until late July (Halterman 2006). The breeding season for cuckoos in southeastern Arizona appears to be prolonged, however, and in most years, conditions are apparently right for producing multiple broods.

Hydrological Conditions

Habitat for the western yellow-billed cuckoo in much of its range is largely associated with perennial rivers and streams that support the expanse of vegetation characteristics needed by breeding western yellow-billed cuckoos. The range and variation of stream flow frequency, magnitude, duration, and timing that will establish and maintain riparian habitat can occur in different types of regulated and unregulated flows depending on the interaction of the water and the physical characteristics of the landscape (Poff et al. 1997, USFWS 2002). Cuckoos often nest where young trees interface with more mature trees, such as along the scour zone of rivers or newly planted revegetation sites on the lower Colorado River (McNeil et al. 2013). Hydrologic conditions at western yellow-billed cuckoo breeding sites can vary widely between years and during low rainfall years, when water or saturated soil may not be present. Cuckoos may move from one area to another within and between years in response to hydrological conditions.

Humidity

Humid and cooler conditions created by surface and subsurface moisture and trapped by the multilayered canopy appear to be important habitat parameters for the western yellow-billed cuckoo. The western yellow-billed breeds in drainages where humidity is adequate for successful hatching and rearing of young (Hamilton and Hamilton 1965; Gaines and Laymon 1984; Rosenberg et al. 1991; McFarland and Horst 2015, 2017). The moist and humid conditions that support riparian plant communities typically exist in lower elevation, broad floodplains, as well as where rivers and streams enter impoundments. However, these conditions can also be found in some areas up to 7,000 feet (or slightly higher in western Colorado, Utah, and Wyoming) in elevation. In the foothills and mountain xero-riparian drainages of southeastern Arizona and Sonora Mexico, high humidity and the summer monsoon are important factors in cuckoo presence (USFWS 2014a, b; MacFarland and Horst 2015, 2017).

Foraging Habitat

In addition to the dense nesting grove or tree, often referred to as the core area, western yellow-billed cuckoos need adequate foraging areas near the nest. Foraging areas can be less dense or patchy with lower levels of canopy cover and may be a mix of shrubs, ground cover, and scattered trees (Sechrist et al. 2009, 2013; Carstensen et al. 2015; Griffin 2015; USFWS, unpubl. data). Cuckoos often forage in open areas, woodlands, orchards, and adjacent streams (Hughes 1999), which include stands of smaller mesquite trees and even tamarisk (Rosenberg et al. 1991). In Arizona, adjacent habitat is usually more arid than occupied nesting habitat. This adjacent habitat can be used for foraging where large insects are produced. Foraging habitat includes Sonoran desertscrub, Mojave desertscrub, Chihuahuan desertscrub, chaparral, semidesert grassland, plains grassland, and Great Basin grasslands (Brown 1994, Brown et al. 2007, Brown and Lowe 1982).

Migration Habitat

Migration habitat needs are not well known, although they appear to include a relatively wide variety of conditions. Migrating yellow-billed cuckoos have been found in coastal scrub, second-growth forests and woodlands, hedgerows, forest edges, and in smaller riparian patches than those used for breeding (USFWS 2014a).

Home Range and Movement

At the landscape level, the available information suggests the western yellow-billed cuckoo requires large tracts of willow-cottonwood, mesquite forest, or Madrean evergreen woodland for their nesting season habitat. Site-specific variation is likely a result of characteristics unique to each location (e.g., types and quality of habitat, configuration of patch), and flexible home ranges with overlapping territories in this weakly territorial species (Hughes 1999; Halterman 2009; Sechrist et al. 2013, p. 417). Habitat can be relatively dense, contiguous stands, irregularly shaped mosaics of dense vegetation with open areas, narrow and linear, or savannah-like. The association of breeding with large tracts of suitable riparian habitat is likely related to home range size. Rangewide, individual home ranges during the breeding season average over 100 ac (40 hectares) (Laymon and Halterman 1987b, Halterman 2009, McNeil et al. 2013, Sechrist et al. 2013).

In studies in Arizona and New Mexico, home ranges of cuckoos fitted with radio-telemetry varied between sites and between individual birds (Table 5; Halterman 2009, Sechrist et al. 2013, McNeil et al. 2013). Home ranges of these three studies averaged between 49 ac (20 ha) and 153 ac (62 ha). Breeding cuckoos occupy overlapping home ranges, exhibit little territoriality, and have flexible home ranges. Cuckoos may shift use areas within home their ranges during a season, perhaps in response resource availability or nesting habitat.

In a study on the lower Colorado River, home ranges of 43 cuckoos tracked for at least 7 days averaged consistently close to 20 ha (95% KDE) during each year, though with high variation (Table 5; McNeil et al. 2013, p. 136). McNeil et al. (2013) found no significant differences in average home range size based on gender, site, or days tracked ($P > 0.05$ for all tests). However,

transient (unmated) birds had significantly larger home range sizes compared to breeding birds, especially females. Of 30 confirmed breeding birds tracked for at least 7 days, the average home range was 18.1 ha compared to 26 ha for 13 presumed non-breeding birds with at least 7 days of data. Females exhibit lower site fidelity and may travel farther distances than males in search of mates or breeding territories (McNeil et al. 2013, p. 136). The core nesting area (50% KDE) averaged 3.6 ± 1.5 ha (equivalent to a circle of radius 107 ± 69 m surrounding the nest).

Table 5. Average western yellow-billed cuckoo home range derived from three studies in Arizona and New Mexico using telemetered birds. Home range size varied greatly with the individual bird and habitat. Home range size has not been studied in more sparsely vegetated riparian habitat or in Madrean evergreen woodland drainages in the Southwest.

Location	Home Range 95% KDE ac (ha)	St Dev ac (ha)	Source
Rio Grande NM (n=13)	153 (62)	± 143 (58)	Sechrist et al. 2013
San Pedro River National Conservation Area AZ (upper San Pedro R) (n=28)	96 (39)	±104 (42)	Halterman 2009
Lower Colorado River AZ (n=43)	49 (20)	± 22 (9)	McNeil et al. 2013

In a study on the San Pedro Riparian National Conservation Area in southeastern Arizona from 2001-2005, the average 95% KDE home range of 28 cuckoos tracked for at least 7 days each was 39 ha, ranging from 1.5 - 158.1 ha (Table 5; Halterman 2009). There were large variances for all home range estimates. There was no significant difference in home range size for nesting or non-nesting, or mated or unmated cuckoos. Males and females had significantly different home ranges sizes, with female home ranges estimated to be 60% smaller than those of males. Double-brooded cuckoos moved significantly farther to renest if their first nest was unsuccessful.

In a study along the Middle Rio Grande in central New Mexico in 2007 and 2008, 13 cuckoos tracked for 5 to 13 days each averaged home ranges of 153 ac (62 ha) ((95%-kernel-home-range (KHR)) (Table 5; Sechrist et al. 2013, p. 411). Home range size varied considerably among individuals, indicating variability in spatial use by cuckoos (Table 9). Additionally, use of habitat differed between core areas and overall home ranges, but the differences were nonsignificant. There was no statistically significant difference between the 95% KHR mean size of home range by sex, although the small sample size suggests low power to detect a difference if it exists (Sechrist et al. 2013, p. 415).

In this same study, the maximum average daily distance traveled (n=10) for both years combined was 0.5 mile (786 meters) (± 0.3 mile (485 meters) SD, range of 204 - 1716 meters (0.13-1.07 mile)), with a maximum average seasonal movement distance of 1 mile (1,599 meters) (± 0.67 mile (1078 meters) SD, range of 365 - 3143 meters (0.23-1.95 miles)) (Sechrist et al. 2013, p. 415). However, the maximum distance traveled by individual cuckoo was highly variable, both daily and seasonally. There was no significant difference in daily or maximum seasonal distance traveled between years; therefore, data for both years were pooled. No significant difference was found in daily or maximum seasonal distance traveled between sexes or between reaches (Sechrist et al. 2013, p. 415). Based on the available information, foraging likely occurs within

0.5 miles from the breeding location. A cuckoo's home range is often irregular (e.g., not circular), and may encompass only part of a 0.5 mile radius from the breeding location. A portion of the vegetation within the home range may be unsuitable for nesting, but may support large insects, frogs, or lizards for foraging.

Presence in Arizona Riparian and Mesquite Woodlands

Many drainages throughout Arizona have not been thoroughly surveyed and it is likely that additional yellow-billed cuckoo locations will be discovered as additional surveys are conducted In a survey in 1999 that covered 265 mi (426 km) of river and creek bottoms (a subset of statewide cuckoo habitat), 172 yellow-billed cuckoo pairs and 81 single birds were located in Arizona (Corman and Magill 2000). Based on this study, site-specific studies, protocol cuckoo surveys, and incidental detections, we know that drainages with yellow-billed cuckoos during the breeding season include Bill Williams River, lower Colorado River, middle Gila River, Hassayampa River, San Pedro River, Santa Maria River, Verde River, Sonoita Creek, Santa Cruz River, Big Sandy River, Arivaca Cienega and Creek, Altar Valley, Agua Fria River, Roosevelt Lake complex, Upper Tonto Creek, Pinto Creek, Mineral Creek, Oak Creek, Cienega Creek, Babocomari River, Pinal Creek, Bonita Creek, San Bernardino National Wildlife Refuge, Hooker Hot Springs, Big Sandy River, and many smaller drainages (American Birding Association 2014, Arizona Game and Fish Department 2016, USFWS 2014a, Cornell Lab of Ornithology 2017, USFWS unpubl. data).

Presence in Southeastern Arizona Mountain Ranges

In addition to gallery riparian forest and mesquite woodlands, yellow-billed cuckoos are also using more xero-riparian drainages in the foothills and mountains of southeastern Arizona (American Birding Association 2014; Corman and Magill 2000; Arizona Game and Fish Department 2016; WestLand Resources, Inc. 2013a, 2013b, 2015a, 2015b, 2015c, MacFarland and Horst 2015, 2017; Tucson Audubon 2015; MacFarland 2017 *in litt*.; Cornell Lab of Ornithology 2017; Marshall 2017 *in litt*.; Moors 2017 *in litt*.).

This kind of habitat is more typical of habitat where cuckoos are found in Sonora, Mexico (Flesch 2008, Russell and Monson 1998). Cuckoos have been detected in at least two years either as a single bird or as pairs in one year during the breeding season in the following areas:

- Santa Rita Mountains: Florida, Madera, Gardner, Chino, Montosa, Box, Walker, Wasp, McCleary, and Barrel Canyons; and in Salero Ranch;
- Huachuca Mountains: Carr, Ash, Garden, Ramsey, and Miller Canyons;
- Canelo Hills: Turkey and O'Donnell Creeks, Collins, Lyle, Merritt, and Korn Canyons;
- Babocomari River;
- Atascosa/Pajarito Mountains: Arivaca Lake and tributaries, Pena Blanca Lake and Canyon, California Gulch, Rock Corral, Scotia, and Sycamore Canyons;
- Baboquivari Mountains: Kitt Peak;
- Patagonia Mountains: Hermosa Creek, Paymaster Spring, Sycamore, Corral, Harshaw, Goldbaum, and Willow Springs Canyons;
- Whetstone Mountains: French Joe and Guindani Canyons;

- Catalina Mountains: Peppersauce Canyon;
- Rincon Mountains: Paige Creek;
- Dragoon Mountains: Slavin Gulch;
- Chiricahua Mountains: Cave Creek.

Yellow-billed cuckoos are likely breeding in a subset of these locations, with nesting confirmed in at least Montosa Florida, Box, and Madera Canyons in the Santa Rita Mountains, Sycamore Canyon and Pena Blanca Lake in the Atascosa/Pajarito Mountains, Peppersauce Canyon in the Catalina Mountains, Paige Creek in the Rincon Mountains, Harshaw Canyon in the Patagonia Mountains, Cave Creek in the Chiricahua Mountains, and Kitt Peak (American Birding Association 2014; MacFarland and Horst 2015, 2017; Tucson Audubon 2015; Cornell Lab of Ornithology 2017).

Threats

The primary threat to the western yellow-billed cuckoo is loss or fragmentation of high-quality riparian habitat suitable for nesting (Corman and Wise-Gervais 2005, USFWS 2014a, 2014b). Habitat loss and degradation results from several interrelated factors, including alteration of flows in rivers and streams, mining, encroachment into suitable habitat from agricultural and other development activities on breeding and wintering grounds, stream channelization and stabilization, diversion of surface and ground water for agricultural and municipal purposes, livestock grazing, wildfire, establishment of nonnative vegetation, drought, and prey scarcity due to pesticides (Ehrlich et al. 1992, USFWS 2014b). Pesticide use is widespread in agricultural areas in the western yellow-billed cuckoo breeding range in the United States and northern Mexico. Yellow-billed cuckoos have also been exposed to the effects of pesticides on their wintering grounds, as evidenced by DDT found in their eggs and eggshell thinning in the United States (Grocki and Johnston 1974, Laymon and Halterman 1987a, Hughes 1999, Cantu-Soto et al. 2011). Because much of the species' habitat is in proximity to agriculture, the potential exists for direct and indirect effects to a large portion of the species in these areas through altered physiological functioning, prey availability, and, therefore, reproductive success, which ultimately results in lower population abundance and curtailment of the occupied range (Laymon 1980; Laymon 1998; Hughes 1999; Colyer 2001, *in litt*; Mineau and Whiteside 2013; Hopwood et al. 2013; Mineau and Palmer 2013; USFWS 2014b).

The ongoing threats, including small isolated populations, cause the remaining populations to be increasingly susceptible to further declines and local extirpations through increased predation rates, barriers to dispersal by juvenile and adult yellow-billed cuckoos, chance weather events, fluctuating availability of prey populations, collisions with tall vertical structures during migration, defoliation of tamarisk by the introduced tamarisk leaf beetle (*Diorhabda* spp.), increased fire risk, and climate change events (Thompson 1961, McGill 1975, Wilcove et al. 1986). The warmer temperatures already occurring in the southwestern United States may alter the plant species composition of riparian forests over time. An altered climate may also disrupt and change food availability for the western yellow-billed cuckoo if the timing of peak insect emergence changes in relation to when the cuckoos arrive on their breeding grounds to feed on this critical food source.

Habitat for the western yellow-billed cuckoo has been modified and reduced, resulting in only remnants of formerly large tracts of native riparian forests, many of which are no longer occupied by western yellow-billed cuckoos. Despite recent efforts to protect existing, and restore additional, riparian habitat in the Sacramento, Kern, and Colorado Rivers, and other rivers in the range of the western yellow-billed cuckoo, these efforts offset only a small fraction of historical habitat that has been lost. Therefore, we expect the threats resulting from the combined effects associated with small and widely separated habitat patches to continue to affect a large portion of the range of the western yellow-billed cuckoo.

Environmental Baseline

The proposed action within yellow-billed cuckoo riparian breeding habitat and adjacent foraging habitat includes the following:

- Proposed treatments in western yellow-billed cuckoo breeding habitat within the action area total 1,010 acres in 26 riparian drainages (Table 6).

- Control lines (33 ft wide) for prescribed fire will usually be placed along the outer edge of, but not within, cuckoo riparian habitat using existing physical features or barriers, including roads, trails, and openings.

- The only treatment within riparian habitat identified as suitable cuckoo habitat is prescribed fire. However, control lines for prescribed fire in riparian habitat will occasionally be placed within cuckoo riparian habitat where no physical features or barriers, including roads, trails, and openings exist in adjacent non-riparian habitat.

- Riparian habitat forming the edge of a burn unit will only receive pre-burn thinning preparation (removing vegetation) if it must be used as a control line for prescribed burns. Drainage bottom control lines will be limited in extent by not treating the entire length of the drainage and retaining as much overstory vegetation as possible to retain nesting habitat and conditions that support a diverse assemblage of insects.

- No pre-burn thinning preparation will occur in cuckoo riparian habitat if it is located within a burn unit and is not bordered by a fire control line.

- In the 26 cuckoo riparian habitat reaches identified in Table 6, low to moderate burn severity will target ground cover and dense shrubs. No trees will be targeted, although occasionally a tree will burn during treatment.

- Treatments will occur no more frequently than once every five years in a given riparian drainage.

- No more than 50% of a riparian drainage will be treated in any given year and will be spread across the landscape and temporally separated.

- No single riparian drainage will be treated along its entire length over the lifespan of the project.

- Mechanical treatment and pre-burn thinning preparation may occur at any time in any habitat other than cuckoo riparian habitat and Mexican spotted owl PACs.

- No burning will occur within the entire action area during the monsoon (July 1 – September 30).

- Other treatments as described in the proposed action section above may occur in cuckoo foraging habitat. Foraging distance is an average of up to 0.5 miles away from cuckoo breeding habitat (Sechrist et al. 2013).

Table 6. Suitable western yellow-billed cuckoo habitat within riparian areas within the Catalina-Rincon Firescape Project, modified from U.S. Forest Service (2017). Pre-burn preparation and prescribed burn (Rx) treatments will occur no more frequently than once every five years in a given riparian drainage. No more than 50% of a riparian drainage will be treated in any given year. Stream drainages with blanks in the Rx column will receive no treatment. Stream drainages where treatments will occur are tallied in the Rx Count column.

Rx Count	Stream Name	Riparian Area (acres)	Rx (acres)
1	Alder Canyon	90	90
2	Ash Creek	108	54
3	Bear Canyon	45	32
4	Bear Creek	36	36
	Bonito Canyon	38	
6	Box Camp Canyon	47	47
7	Buehman Canyon	39	39
8	Bullock Canyon	64	26
9	Caliente Canyon	70	45
10	Canada Del Oro	115	115
11	Cargodera Canyon	36	21
	Carter Canyon	19	
12	Deer Creek	10	10
13	Distillery Canyon	25	23
	East Fork Sabino Canyon	94	
14	Edgar Canyon	46	46
15	Geesaman Wash	21	21
16	Joaquin Canyon	75	56
17	Lemmon Canyon	15	15
	Miller Canyon	2	
18	Molino Canyon	26	11
19	Nugget Canyon	33	25

Rx Count	Stream Name	Riparian Area (acres)	Rx (acres)
20	Paige Creek	211	176
	Peppersauce Wash	29	
21	Pima Canyon	14	11
	Posta Quemada Canyon	8	
22	Romero Canyon	65	39
	Sabino Canyon	2	
23	Soldier Canyon	23	4
24	Stratton Canyon	13	13
	Sutherland Wash	12	
25	Sycamore Canyon	36	36
	Tanque Verde Canyon	13	
26	Turkey Creek	19	18
	Grand Total	**1501**	**1010**

Status of the species, critical habitat, and factors affecting species environment and critical habitat within the action area

No proposed critical habitat exists within the action area; therefore, none will be affected. However, recent surveys and incidental detections since publication of the proposed critical habitat rule indicate cuckoo presence and likely breeding within the action area. Cuckoos have been detected during the breeding season in Madrean evergreen woodland drainages (primarily riparian habitat containing more xero-riparian species, bordered by Madrean evergreen woodland uplands) in Peppersauce Canyon from 2015 to 2017, Geesaman Canyon in 2015, in Paige Creek in 2016 and 2017, and along Tanque Verde Creek in 2017 at Italian Trap, 2.5 miles NE of Chivo Falls (MacFarland and Horst 2015, 2017; WestLand Resources, Inc. 2015; Cornell Lab of Ornithology 2017; MacFarland 2017 *in litt*; Taiz 2017 *in litt*). In Peppersauce Canyon, a single bird was detected on August 3, 2015 and a pair was detected on August 17, 2015 during surveys; two pairs were detected in 2016 during surveys, and a cuckoo was detected by birders during the breeding season in 2017 but no cuckoos were detected during protocol surveys; in Geesaman Canyon, a single bird was detected on June 29, 2015; and in Paige Creek, 7 breeding territories (pairs or breeding behavior) were detected during surveys in 2016 and pairs were also detected in 2017 (MacFarland and Horst 2016, MacFarland and Horst 2017, MacFarland 2017 *in litt*). The website ebird shows incidental cuckoo detections of western yellow-billed within the action area (Cornell Lab of Ornithology 2017), indicating surveys are needed to determine occupancy throughout the breeding season.

The overstories of occupied mid-elevation drainages in the CNF are usually dominated by oaks, with occasional mesquites or junipers on the fringes (MacFarland and Horst 2017). The drainages often merge into surrounding grasslands or uplands with junipers, scrub-form mesquites, and numerous other shrubby plants. In the wettest reaches of these drainages, the oaks are interspersed with, or replaced by, Arizona sycamore (*Platanus wrightii*), netleaf

hackberry (*Celtis reticulata*), willows, cottonwood, Arizona ash (*Fraxinus velutina*), and Arizona walnut (*Juglans major*). Cuckoos usually occupy wider, shallower portions of drainages with gradually sloped walls than the steeper narrower portions of the canyons.

In 2016, pair-occupied territories found during surveys in the CNF had both a higher percentage of total canopy cover ($p=0.034$, unpaired t-test, one tailed) and a much higher percentage cover of riparian obligate trees (sycamore, cottonwood, ash, etc.) in the community composition ($p<0.00001$, unpaired t-test, 1 tailed) while unoccupied survey points had a higher percentage of junipers ($p=0.035$, unpaired t-test, 1 tailed) (MacFarland and Horst 2017). Trees were taller where pairs were found, indicating these drainages had more-available water than did the drainages without detected cuckoos. Drainages occupied by cuckoos on average had slightly higher levels of understory cover with the greatest differences being that occupied territories had more forbs and wildflowers and tall bunchgrasses.

The action area contains 1,501 acres of riparian habitat (Table 6). Of these, 1,010 acres are proposed for treatment (Table 6). Formal surveys throughout these acres have not been completed, but it is likely they provide habitat for the western yellow-billed cuckoo.

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.

Direct and Indirect Effects

Based on evidence of cuckoo pairs and breeding behavior in Peppersauce Canyon and Paige Creek, western yellow-billed cuckoos are believed to be breeding in these and other riparian drainages within the action area (Table 6). Prescribed fire and mechanical thinning projects have occurred in habitat used by western yellow-billed cuckoo on the CNF and are expected to continue. Therefore, proposed fire and non-fire treatments may directly and indirectly affect cuckoos by removing suitable habitat and displacing breeding or foraging birds and/or by disturbing cuckoos where suitable habitat is not displaced, but within the vicinity of project activities.

These kinds of projects can have short-term adverse effects on western yellow-billed cuckoo habitat by reducing cover, affecting water quality, and reducing prey abundance. Human activity implementing the proposed action and associated fire and smoke can alter cuckoo behavior by creating visual, noise, and physiological disturbance. Yellow-billed cuckoos may exhibit avoidance ranging from less than a day where visual and noise disturbance is temporary to more than one breeding season where breeding and foraging habitat have been removed. If cuckoos are present t at the time of thinning or prescribed burning activities, individuals could abandon their roosting and nesting sites. If nests are abandoned, young or eggs would be lost. Any

individuals present in or adjacent to treated areas could also experience impacts from loss of prey availability, fire, and visual, noise, and smoke disturbance. The effects could range from habitat use changes, activity pattern changes, increased stress responses, decreased foraging efficiency and success, reduced reproductive success, increased predation risk, and intraspecific diminished communication (NoiseQuest n.d. [2012]; Pater et al. 2009). These responses can vary depending on the nature of the disturbance, but are expected to decrease as the distance from the activity increases.

Although no burning will occur within the entire action area during the monsoon (July 1 – September 30), which avoids the peak of the breeding season, adverse effects to cuckoos and habitat are still likely to occur during migration and the early part of the breeding season. Prescribed burning just prior to arrival reduces the available foraging habitat and prey species to cuckoos. Cuckoo home ranges are large, and usually at least 50 acres in size. As such, impacts to cuckoos and habitat from thinning and prescribed fire may occur within cuckoo riparian breeding habitat and adjacent foraging habitat up to 0.5 miles away.

Prescribed fire, and to a lesser extent mechanical thinning, also benefit cuckoos by maintaining long-term ecosystem function in these fire-adapted landscapes. Thinning and fire promote seral stage diversity and reduce fuel build-up that may otherwise result in a stand-replacing, high-severity fire. The regenerating and resprouting trees, shrubs and herbaceous vegetation resulting from fire increase the insect production needed by cuckoos to raise young.

No pre-burn vegetation removal is targeted for cuckoo riparian habitat, but prescribed burning will occasionally use riparian drainages as control lines where no natural physical barriers, roads, trails, or openings can be used. The 33 ft wide drainage bottom control lines will be limited in extent by treating no more than 50% of a drainage no more than every five years and retaining as much overstory vegetation as possible to retain nesting habitat and conditions that support a diverse assemblage of insects. Conservation measures described above will ensure that effects to riparian habitat will be spread across the landscape and temporally separated. In this way, there will never be a case over the lifespan of the project that a single riparian drainage will be treated along its entire length.

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 BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Climate change, in combination with drought cycles, is likely to exacerbate existing threats to the western yellow-billed cuckoo's habitat in the southwestern United States, now and into the foreseeable future. Increased and prolonged drought associated with changing climatic patterns will result in continued warming and drying of riparian habitats, will likely alter vegetation structure and composition, and will reduce the amount and quality of nesting and foraging habitat for yellow-billed cuckoos in the action area. However, implementation of restoration and

fuels reduction projects such as the proposed action should help to mitigate some of the long-term effects of climate change on western yellow-billed cuckoo habitat.

The CNF manages almost all lands within the action area and administers projects and permits on those lands; thus, almost all activities that could potentially affect the Western yellow-billed cuckoo are Federal activities and subject to additional section 7 consultation under the Act. The exceptions are unregulated activities on Federal and non-Federal lands, such as trespass livestock and inappropriate use of OHVs within watersheds containing yellow-billed cuckoos, which can adversely affect the species through alteration of the stream banks by suppressing riparian vegetation, trampling banks, changing flow regimes, and erosion.

Conclusion

After reviewing the current status of the western yellow-billed cuckoo, the environmental baseline for the action area, the effects of the proposed Catalina-Rincon Firescape Project, and the cumulative effects, it is our BO that the Catalina-Rincon Firescape Project, as proposed, is not likely to jeopardize the continued existence of the western yellow-billed cuckoo. We base this conclusion on the following:

- Prescribed burning in cuckoo riparian habitat may occur during migration and the early part of nesting season (May 15 – July 1), but it will not occur during the height of the breeding season (July 1 – September 30).
- Treatment in cuckoo riparian and adjacent foraging habitat prior to the breeding season may promote tree resprouting, herbaceous growth, and insect production during the monsoon when cuckoos are nesting.
- No pre-burn thinning will occur in cuckoo riparian habitat except where needed for fire control lines.
- Low to moderate burn severity will target ground cover and dense shrubs in cuckoo riparian habitat. No trees will be targeted.
- Although cuckoos may be adversely affected by loss of habitat and disturbance in the short-term in cuckoo riparian and adjacent foraging habitat, the proposed action benefits cuckoos long-term by reducing the risk of a high intensity fire that destroys breeding and foraging habitat.
- Although cuckoos may be adversely affected by loss of habitat and disturbance in the short-term, the proposed action benefits cuckoos long-term by mimicking the natural fire cycle that promotes regeneration of fire-adapted vegetation in cuckoo breeding and foraging habitat

While Western yellow-billed cuckoos may be disturbed by proposed activities occurring within riparian and adjacent habitat while they are present (May 15 – September 30), design features in Table 2 contain several measures that will avoid or minimize the adverse effects of the proposed action, including to cuckoo breeding and foraging habitat. These include:

- Prescribed Fire Design Features to Protect All Resources

    - Areas of significant human activity during prescribed fire operations, such as fire crew camps and equipment staging areas, would not be located on or adjacent to sensitive sites such as habitat of protected species or archaeological sites. Such activities should also be kept to the minimum area possible and should be located in previously disturbed sites whenever possible.

- Wildlife, Fish, and Plants

    - Resource advisors will be consulted regarding all treatment and prescribed burning activities. They will also be responsible for coordination with the agencies on federally listed and other sensitive species. They will monitor fire and vegetation management activities to ensure the protective measures are implemented.
    - Resource advisors will coordinate site-specific burn and implementation plans with the USFWS and AGFD to identify site-specific measures to protect federally listed and sensitive species, and species of concern.
    - Implementation activities in habitats of threatened, endangered, sensitive species, and/or species of concern will include oversight or coordination with wildlife staff. Coordination may include training of crews in: the identification of sensitive species; avoidance of impacts to sensitive species (e.g., identification and avoidance of wildlife use/habitat elements, such as nests, cavities, and woodpecker foraging holes); notification of the appropriate agencies (i.e., AGFD or USFWS) if a sensitive, threatened, or endangered species is encountered; and that individuals must not be picked up or removed without a permit.
    - Prescriptions (particularly timing and intensity of burn) for projects within or adjacent to suitable habitat for federally listed and sensitive plant populations will be designed to maintain or improve the existing population or habitat.
    - Nesting birds and sensitive plants: the local biologist will be consulted for species and site-specific guidance when developing burn/implementation plans, especially for fire treatments outside the normal natural fire season.
    - Drainage bottom control lines will be limited in extent to retain nesting habitat and conditions that support a diverse assemblage of insects, and to ensure a mosaic of conditions within riparian habitat across the landscape by separating riparian fire line treatments spatially and temporally. Specifically for the cuckoo this includes:
        - When creating control lines for prescribed burns in riparian habitat, no more than 50% of a given riparian drainage will be modified in any given year to retain as much overstory vegetation as possible.
        - Re-entry into riparian areas that are to be treated more than once during the life of the project will not occur within five years.

- Riparian Areas and Wetlands
    - Prescribed fire control actions in riparian areas will apply minimum impact suppression tactics to minimize damage to stands of native vegetation and soils from planned or unplanned fire operations.
    - To the extent possible, large, downed woody materials and snags that are not a hazard to firefighters will be retained, and large logs (12 inches diameter and greater and 8 feet or more long) will not be cut into sections.
    - All age classes of riparian species (defined in FSM 2526, Riparian Watershed Management) will be retained.
    - Fire management (e.g., control lines) and rehabilitation in riparian corridors will be coordinated with a Resource Advisor.
    - Site-specific implementation plans (e.g., CNF Fire Management Plan) that include management areas with federally listed aquatic or riparian-obligate species will specify fire management objectives and prescribed burning guidance, taking into account the special concerns related to these species.
    - In riparian areas, natural barriers, openings in riparian vegetation, or topographic features will be used where possible as the easiest, safest method to manage prescribed fire.
    - Use of heavy mechanical equipment will be minimized in:
        - wet (hydro-) riparian drainages or
        - on wet upland soils if rutting greater than 3 inches is occurring
    - The use of fire retardants or chemical foams in riparian habitats or within 300 feet of aquatic habitats will be avoided; particularly sites occupied by federally listed species. Retardant Avoidance Zones will be followed.
    - Placement of prescribed fire support sites (e.g., camps, staging areas and, refueling sites) will be outside riparian areas or river/stream corridors.

The conclusions of this BO are based on full implementation of the project as described in the **DESCRIPTION OF THE PROPOSED ACTION** section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

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

provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The USFWS and the National Marine Fisheries Service (NMFS) published a Final Rule on May 11, 2015 (80 FR 26832- 26845; USFWS and NMFS 2015), amending the incidental take statement provisions of the implementing regulations for section 7 of the Act (50 CFR 402.02 and 402.14) to: (1) to refine the basis for development of incidental take statements for programmatic actions; and (2) address the use of surrogates to express the amount or extent of anticipated incidental take. With respect to the use of surrogate measures of incidental take, we amended 402.14(i)(1)(i) of the regulations to clarify that surrogates may be used to express the amount or extent of anticipated take, provided the biological opinion or the incidental take statement: (1) Describes the causal link between the surrogate and take of the listed species; (2) describes why it is not practical to express the amount of anticipated take or to monitor take related impacts in terms of individuals of the listed species; and (3) sets a clear standard for determining when the amount or extent of the taking has been exceeded.

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

Amount or Extent of Take

We anticipate that the proposed action will result in incidental take of western yellow-billed cuckoos in the form of harm through temporary loss of suitable and occupied habitat from removal of vegetation and disturbance that alters the behavior of the birds. Although western yellow-billed cuckoo are migratory and spend only part of the year in the action area, the area is still considered occupied because cuckoos are detected throughout the action area and on nearby properties during the breeding season (USFWS 2014a, b; Halterman et al. 2016). Because western yellow-billed cuckoos have large home ranges averaging from 50 to greater than 100 acres (see ***Home Range and Movement*** section, above) and are known to be present in the action area, including in pairs, the action area likely contains multiple home ranges of nesting western yellow-billed cuckoos.

We recognize that providing a numerical estimate of incidental take is the preferred method of measuring take. However, we must use habitat as a surrogate for the amount or extent of take because the number of western yellow-billed cuckoos in a given area cannot be determined with existing information and techniques. Counting western yellow-billed cuckoos is difficult because males and females look and sound alike, they have large overlapping home ranges, they are behaviorally secretive, they have short breeding cycles, and they can move to different

locations within and between breeding seasons (Halterman et al. 2016). These factors can lead to either underestimating or overestimating the number of western yellow-billed cuckoos. Protocol surveys (Halterman et al. 2016) are designed only to determine presence/absence in a given reach rather than an accurate count of individual birds. Moreover, while some cuckoos may be directly affected by treatments within their home ranges, others may be indirectly affected by displacement of western yellow-billed cuckoo throughout suitable breeding and foraging habitat within the action area. Additional surveys and methods, including banding and possibly monitoring telemetered birds, would need to be employed to obtain an accurate count of individual birds and pairs throughout the breeding season. Such efforts are impractical for a project such as the proposed action, and would themselves result in additional harassment of western yellow-billed cuckoos.

Although protocol surveys do not provide an accurate count of cuckoos, and cuckoos can occur in different locations from year to year, protocol survey results can nevertheless be used as a tool to refine treatment boundaries to minimize take of individual birds. If cuckoos are detected during protocol surveys in more than one survey period the year prior to treatment, it is reasonable to assume that cuckoos are likely to also be present the year of the treatment. Removing vegetation through mechanical, chemical, or prescribed burning in June may harm or kill eggs, young, or adults at an active nest site. Removing vegetation prior to June may destroy or reduce the quality of nesting habitat that would otherwise have been used by returning cuckoos. Altering the timing or boundaries of the treatment can minimize take by avoiding cuckoos, eggs, and young in June (within the treatment period) or by avoiding the removal of suitable breeding habitat.

Again, and despite the necessity of protocol surveys in order to minimize harm of western yellow-billed cuckoos, it is not possible to determine specific numbers of affected birds. We therefore express the incidental take of western yellow-billed cuckoos in terms of affected riparian vegetation. The riparian vegetation within the action area is a valid surrogate for incidental take because, as discussed in the effects analysis above, western yellow-billed cuckoos have been documented within such reaches within the action area and riparian trees are required for breeding. Removal of the vegetation within cuckoo riparian habitat is anticipated to adversely affect cuckoos, thus establishing a causal link between the effects of the proposed action, the surrogate measure of take (habitat), and the indeterminable number of cuckoos that will be incidentally taken. Although adverse effects to cuckoos and habitat resulting from pre-burn activities and prescribed fire in adjacent foraging habitat are also occurring, quantifying these adverse effects is more difficult. Effects from activities in areas immediately adjacent to cuckoo foraging habitat are often greater than those occurring farther away due to proximity to visual disturbance, noise, fire, smoke, and nearby food resources. However, cuckoos can forage in a greater variety of habitats than they can breed in and can forage a maximum average daily distance of 0.5 miles from breeding sites. We chose not to quantify the adjacent foraging habitat that cuckoos may be using as a surrogate for incidental take because cuckoos appear to be using a variety of densities of trees common in these areas that will likely remain post-treatment (although may shift across the landscape) due to the mosaic burn pattern typical of most low- to moderate-effect prescribed fires.

Furthermore, it is reasonable to assume that the abundance of western yellow-billed cuckoos in the action area, while indeterminable, is correlated with the extent of suitable riparian breeding habitat. We therefore quantified the adverse effects of the proposed action as the number of acres of tree habitat that we anticipate will be degraded due to fire control line construction or prescribed burning activities in cuckoo breeding habitat. No burning or mechanical treatment is prescribed in cuckoo riparian habitat except where fire control lines cannot be placed in adjacent non-riparian habitat. We anticipate tree cover loss is up to 20% in each of the riparian areas (see Table 10) within the 1,010 acres of suitable western yellow-billed cuckoo habitat proposed for treatment in 26 drainages. The purpose of the proposed activity is to avoid severe fire effects within riparian areas; therefore, we do not anticipate that all 1,010 acres proposed for treatment will be adversely affected. If ≥ 20% tree loss occurs within one of the 26 drainages and does not regenerate within 3 years, it is anticipated the western yellow-billed cuckoo and its breeding habitat will be affected (reduced territories and productivity, increased predation) by the project.

Therefore, due to the removal and alteration of western yellow-billed cuckoo nesting habitat, we anticipate that the project will result in harm or harassment of western yellow-billed cuckoos utilizing up to 202 acres (20% of each of the riparian areas within the 1,010 acres of habitat) within the Catalina and Rincon Mountains. Removal of western yellow-billed cuckoo habitat within these areas will harm and harass western yellow-billed cuckoo by reducing the quality and amount of suitable habitat, likely resulting in reduced productivity, and/or it will displace birds to adjacent areas. Western yellow-billed cuckoos attempting to nest within or near affected areas are expected to be harmed by reduced productivity from altered suitable habitat within their home range(s) and/or increased levels of predation. Displaced western yellow-billed cuckoo attempting to nest elsewhere in the Catalina and Rincon Mountains are anticipated to encounter and potentially compete with birds already nesting in those areas.

Incidental take will be considered to have been exceeded if, after three years, ≥ 20% of the tree cover in any of the riparian areas (see Table 10) within the 1,010 acres of suitable western yellow-billed cuckoo habitat proposed for treatment in 26 drainages has not been successfully reestablished to reflect the linear distribution of this vegetation type as it was pre-treatment within the Catalina and Rincon Mountains.

The USFWS will not refer the incidental take of any migratory bird under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703-712, if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Effect of the Take

In this BO, the USFWS has determined that this level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

Section 7 requires minimization of the level of take (USFWS and NMFS 1998). It is not appropriate to require mitigation for the impacts of incidental take. Reasonable and prudent measures can include only actions that occur within the action area, involve only minor changes

to the project, and reduce the level of take associated with project activities. These measures should minimize the impacts of incidental take to the extent reasonable and prudent. For example, a measure may call for actions like education of employees about the species, reduction of predation, removal or avoidance of the species, or monitoring. Measures are considered reasonable and prudent when they are consistent with the proposed action's basic design (e.g., narrowing of disturbed right-of-way at known species locations), location (e.g., temporary storage of equipment or other materials), scope, duration, and timing. The test for reasonableness is whether the proposed measure would cause more than a minor change to the project.

Reasonable and prudent measures and terms and conditions should be developed in coordination with the action agency and applicant, if any, to ensure that the measures are reasonable, that they cause only minor changes to the project, and that they are within the legal authority and jurisdiction of the agency or applicant to carry out (USFWS and NMFS 1998). For example, the effect of measures costing $10,000 or $100,000 may be critically significant for a single family boat dock, but minor for a multi-million dollar development complex. An example of an unreasonable measure would be a timing delay to minimize the impacts of incidental take if project timing is critical.

Reasonable and prudent measures serve to minimize impacts on the specific individuals or habitats affected by the action (USFWS and NMFS 1998). Activities resulting from these measures must occur within the action area, which may be larger than the footprint of the project itself (see description of action area in section 4.5(A)).

The following reasonable and prudent measure is necessary and appropriate to minimize take of western yellow-billed cuckoos:

1. The CNF shall monitor incidental take resulting from the proposed action and report to the USFWS the findings of that monitoring.

Terms and Conditions

The terms and conditions set out the specific methods by which the reasonable and prudent measures are to be accomplished, e.g., who is to be educated, when/what/how; the actions necessary to reduce predation; who may remove or how to avoid the species; or the protocol for monitoring. Terms and conditions of an incidental take statement must include reporting and monitoring requirements that assure adequate action agency oversight of any incidental take [50 CFR §402.14(i)(1)(iv) and (i)(3)]. The monitoring must be sufficient to determine if the amount or extent of take is approached or exceeded, and the reporting must assure that the Services will know when that happens." (USFWS and NMFS 1998).

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

The following terms and conditions are necessary and appropriate to minimize take of western yellow-billed cuckoo:

1.1 The CNF shall monitor the project area and other areas that could be affected by the proposed action to ascertain take of individuals of the species and/or loss of its habitat that causes harm or harassment to the species. To monitor individuals, the CNF will conduct protocol surveys (Halterman et al. 2016, or future protocols that may replace it) within cuckoo riparian habitat to determine occupancy in the year prior to implementing treatments. Cuckoos may be nesting in June and if cuckoos are detected on more than one survey in the year prior to the treatment, we assume cuckoos are likely to also be present the year of the treatment. To monitor habitat, it is expected the CNF may partner or contract with researchers or contractors to determine the effects of the proposed action.

1.2 The CNF shall use the most effective methods possible to restore riparian vegetation, including, but not limited to, natural regeneration and plantings. Planting techniques should implement the most current best practices (e.g., Dreesen et al. 2002, Hoag 2007, Los Lunas Plant Materials Center (undated)).

1.3 In the event a western yellow-billed cuckoo or active nest is found within a planned treatment area, CNF shall contact USFWS to discuss options to minimize take if time permits or avoid burning within at least 500 ft of the patch where the cuckoo or nest was detected. Removing vegetation through mechanical, chemical, or prescribed burning in June may harm or kill eggs, young, or adults at an active nest site. Removing vegetation prior to June may destroy or reduce the quality of nesting habitat that would have been used by returning cuckoos. Altering the timing or boundaries of the treatment can minimize take by avoiding cuckoos, eggs, and young in June (within the treatment period) or by avoiding the removal of suitable breeding habitat. The acreage of the avoided patch shall be subtracted from the total acreage treated.

1.4 The CNF shall submit annual monitoring reports to the Arizona Ecological Services Field Office by December 1 beginning in 2018. These reports shall briefly document for the previous calendar year the effectiveness of the terms and conditions and locations of listed species observed, and, if any are found dead, suspected cause of mortality. The report shall also summarize tasks accomplished under the proposed minimization measures and terms and conditions. The report shall make recommendations for modifying or refining these terms and conditions to enhance listed species protection or reduce needless hardship on the CNF and its permittees.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize 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 Corps 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.

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 CNF work with us to conduct Mexican spotted owl surveys over the next several years to attempt to determine how owls modify their territories in response to prescribed and wildland fires on the CNF. This information will aid us in understanding the short- and long-term impacts of fire on the owl and their subsequent effects on the status of the species in the BRW EMU. Surveys should be coordinated with the USFWS prior to implementation of any project. In addition, we recommend that CNF initiate a process in coordination with the USFWS to redefine PAC boundaries in order to comply with the guidelines of the Mexican Spotted Owl Recovery Plan.

2. We recommend that the CNF continue to work with us to design forest restoration treatments across the forest that protect existing nest/roost habitat from high-severity, stand-replacing fire, and enhance existing or potential habitat to aid in sustaining Mexican spotted owl habitat across the landscape. PACs can be afforded substantial protection from wildland fire by emphasizing fuels reduction and forest restoration in surrounding areas outside of PACs and nest/roost habitat.

3. We recommend that the CNF work with us to conduct western yellow-billed cuckoo surveys following prescribed-fire treatments in conjunction with the required pre-treatment surveys to be conducted in the year prior to the prescribed burn. This will assist us in determining how cuckoos respond to prescribed and wildland fires on the CNF, and will aid us in understanding the short- and long-term impacts of fire on the cuckoo and their subsequent effects on the status of the species in southern Arizona and the DPS. Surveys should be coordinated with the USFWS prior to implementation of any project.

4. We recommend that the CNF meet regularly with us to design restoration treatments across the forest that protect existing western yellow-billed cuckoo habitat from high-severity, stand-replacing fire, and enhance existing or potential habitat to aid in sustaining yellow-billed cuckoo habitat across the landscape. This could include discussing the effectiveness of planting techniques and revising them as necessary.

5. We recommend that the CNF work with us to design and implement food plant monitoring plots for the lesser long-nosed bat as described in the de-listing package for the species.

6. We recommend that the CNF work with us and other partners to find locations within the action area appropriate for lowland leopard frog restoration.

7. We recommend that the CNF coordinate with us during the development of the Implementation Guides for each Burn Plan developed under the proposed action.

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

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the USFWS'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.

REINITIATION NOTICE

This concludes formal consultation for the proposed Catalina-Rincon Firescape 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.

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

For more information regarding the MBTA and Eagle Act, please visit the following websites. More information on the MBTA and available permits can be retrieved from FWS Migratory

Bird Program web page and FWS Permits Application Forms. For information on protections for bald eagles, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR 31132) published in the Federal Register on June 5, 2007, as well at the Conservation Assessment and Strategy for the Bald Eagle in Arizona (Southwestern Bald Eagle Management Committee website).

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

We appreciate the CNF's efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2016-F-0773 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Marit Alanen at (520) 670-6150 (x234) or Scott Richardson at (520) 670-6150 (x242).

Sincerely,

For Scott Richardson

Steven L. Spangle
Field Supervisor

cc (hard copy):
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

cc (electronic):
Field Supervisor, Fish and Wildlife Service, Phoenix, Arizona
Tohono O'odham Nation, Sells, Arizona (Attn: Marlakay Henry)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, Arizona (pep@azgfd.gov)
Raul Vega, Regional Supervisor, Arizona Game and Fish Department, Tucson, Arizona

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FIGURES

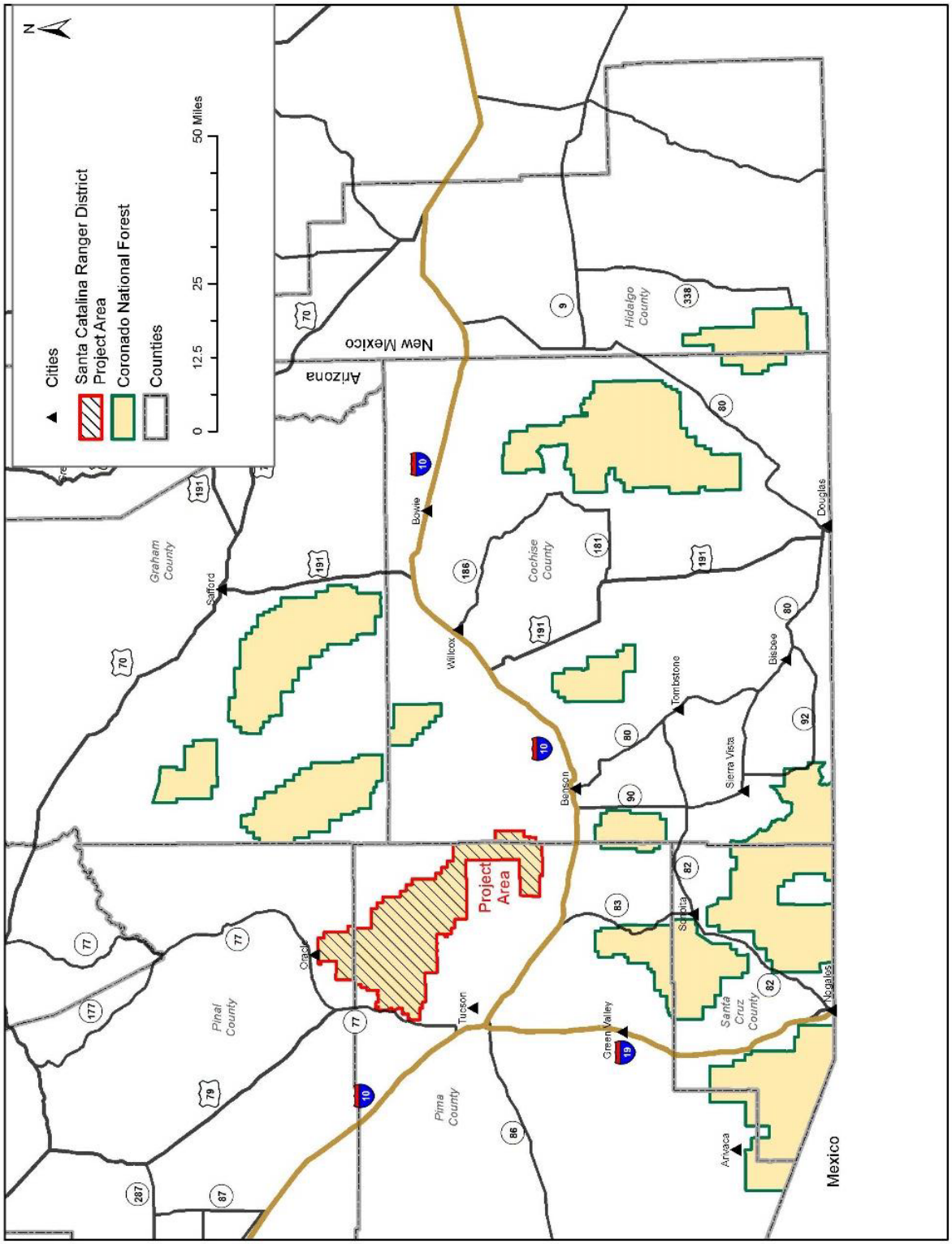

Figure 1. Vicinity map and boundary showing lands where the Catalina-Rincon FireScape Project is proposed.

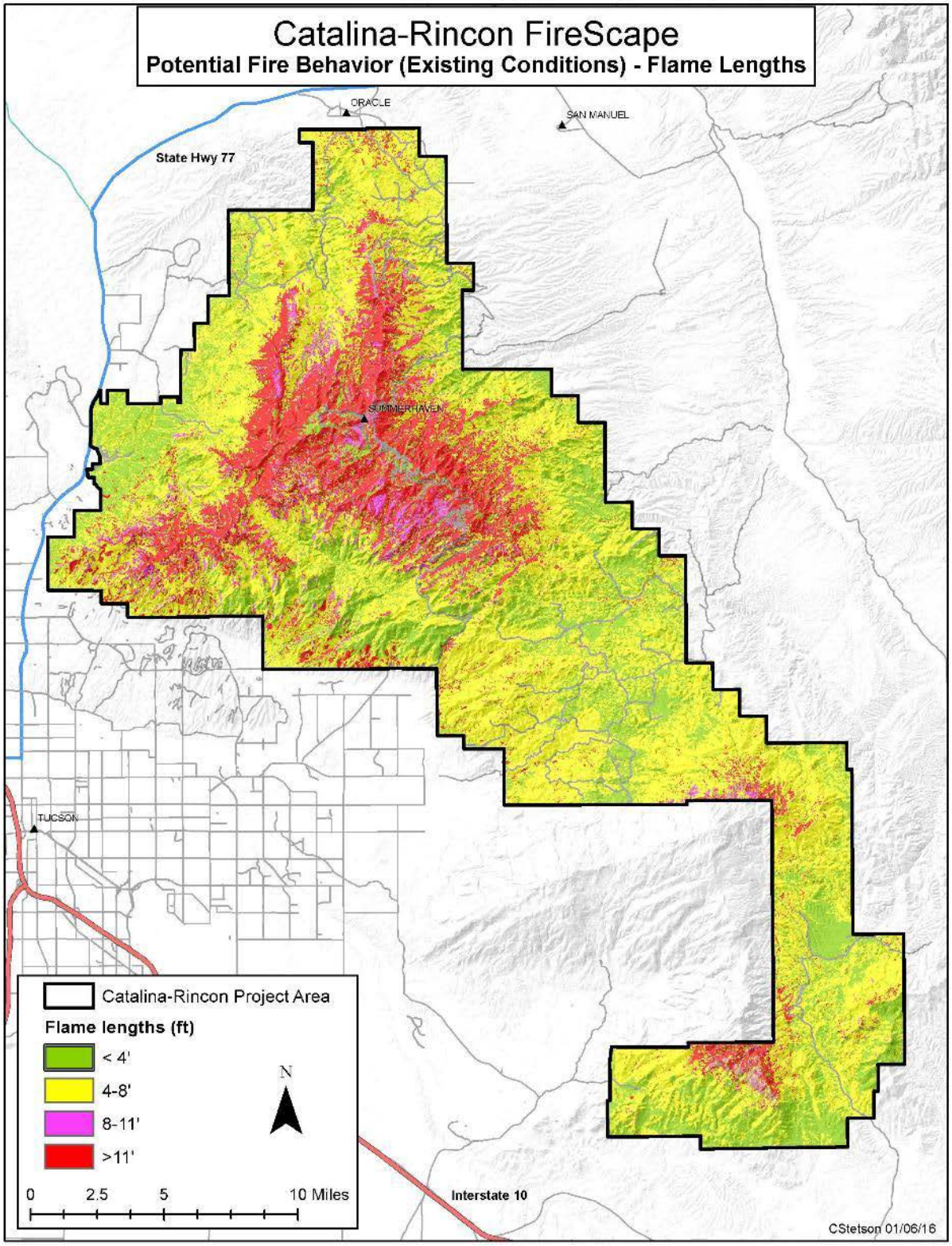

Figure 2 (Figure 3 in the Biological Assessment). Predicted flame lengths assuming existing vegetation and fuel conditions in the Santa Catalina and Rincon Mountain ranges in southeastern Arizona.

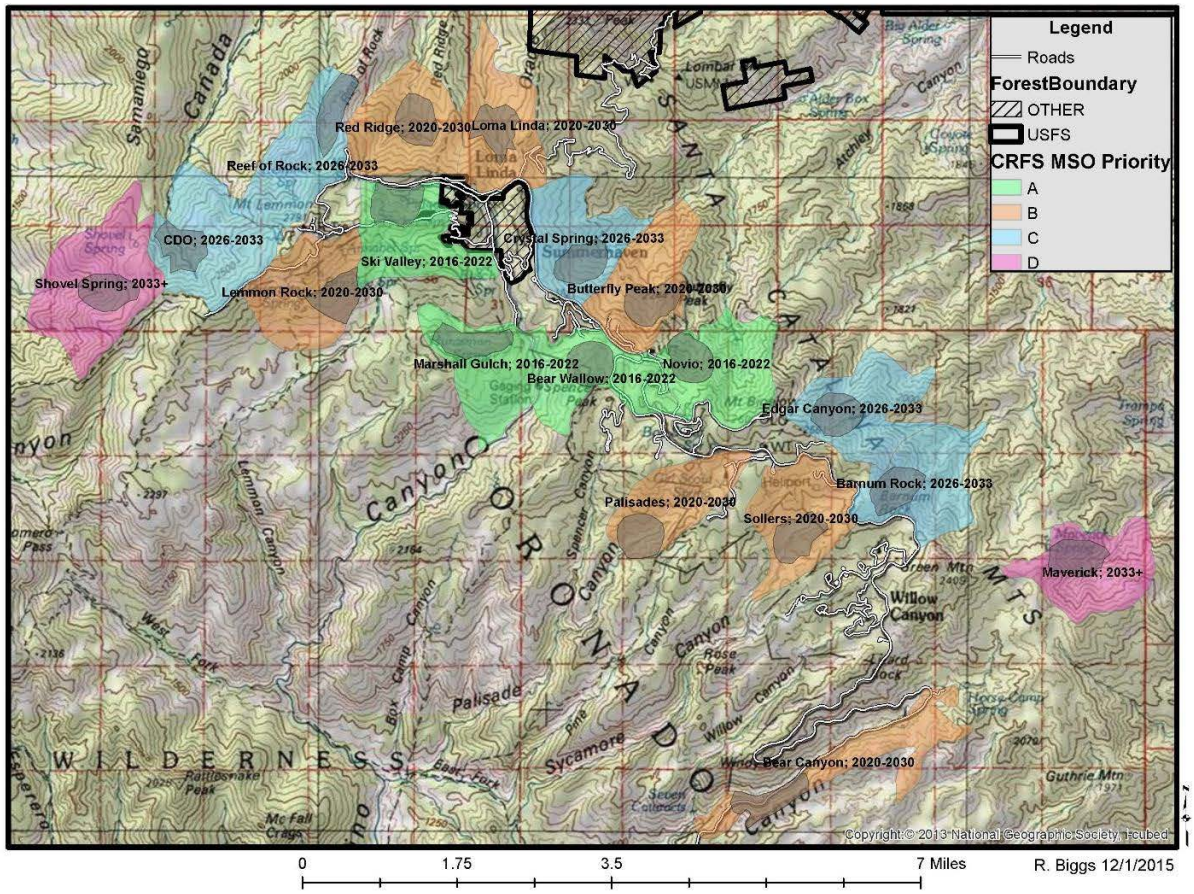

Figure 3 (Figure 6 in the Biological Assessment). Proposed priority treatment schedule of Mexican spotted owl protected activity centers. Priority Group A would be scheduled for treatment between 2016 and 2022; Priority Group B would be scheduled for treatment between 2020 and 2030; Priority Group C would be scheduled for treatment between 2026 and 2033; and Priority Group D would be scheduled for treatment after 2033.

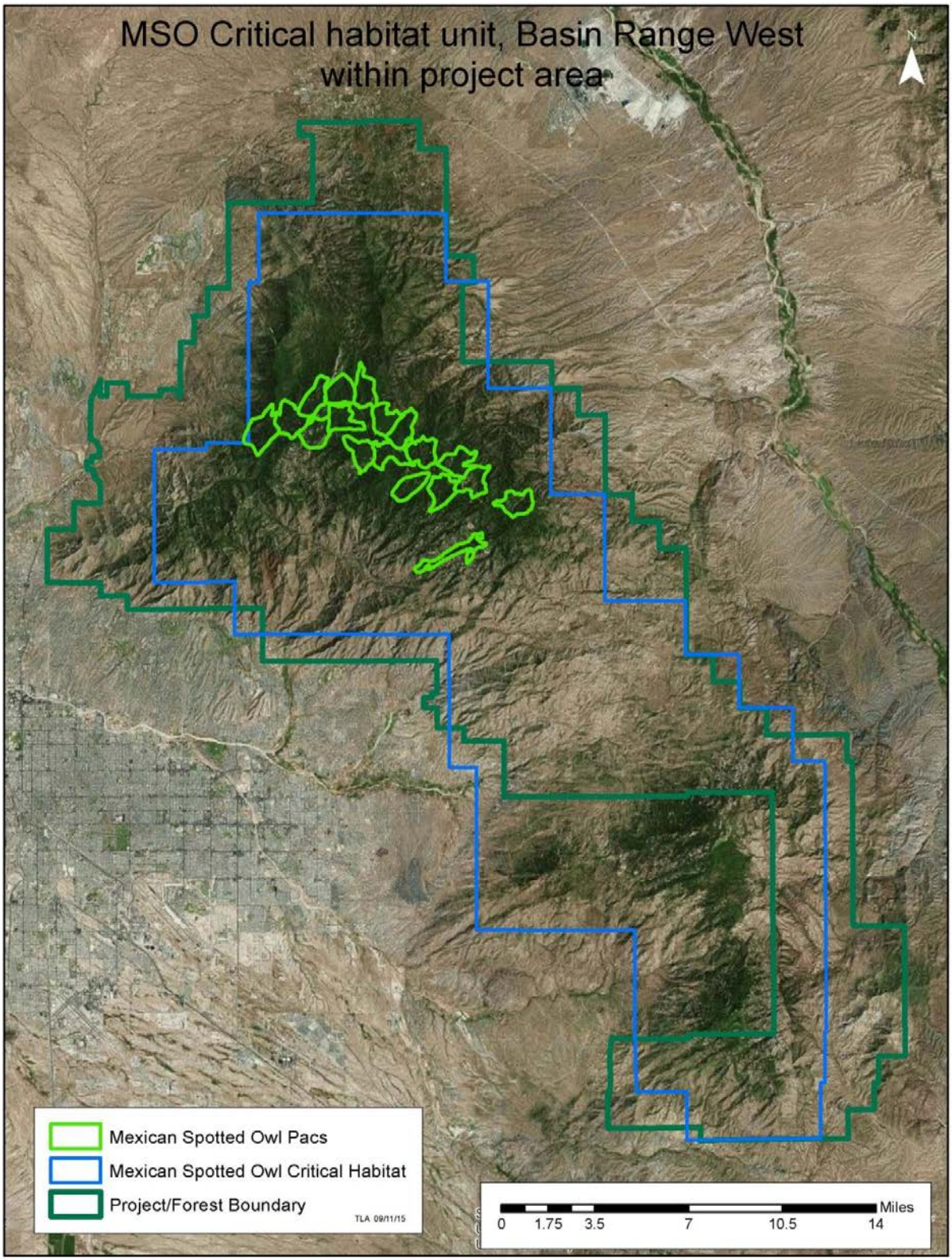

Figure 4 (Figure 5 in the Biological Assessment). Mexican spotted owl Protected activity centers (PACs) and critical habitat within the project area.

Appendix A: Concurrences

Lesser long-nosed bat

The lesser long-nosed bat is known from grasslands, arid scrublands, and oak woodlands below 5,500 ft in elevation. In Arizona, these bats arrive in mid-April in the western portion of the state to give birth in caves, abandoned mine shafts, and tunnels. Young are typically born in these maternity colonies in mid-May. Females and young remain in maternity roosts and forage on primarily saguaros below about 3,500 ft until approximately mid-July. At this time, lesser long-nosed bat use shifts to the central and eastern portions of Arizona and the boot heel of New Mexico. where they feed primarily on agaves. These bats typically leave southern Arizona by late September to early October.

There are records of lesser long-nosed bat roost sites within the project area, and suitable foraging habitat exists within it. Three current or former roost sites are known from within the boundary of the Santa Catalina Ranger District, including Campbell Cave, Pontatoc Cave, and Agua Caliente Cave. An additional three current or former roost sites are known to be within three miles of the forest boundary, including Youtcy, Rincon Gold, and Colossal Cave (USFWS 2016). Of the three roost sites within the forest boundary, none are located in areas proposed for treatment by the proposed project; they occur in Sonoran desert scrub habitat that is excluded from treatment. The remaining adjacent sites are beyond one mile from the forest boundary and outside the proposed treatment areas.

Conclusion

The Service concurs with the CNF's determination that the action may affect, but is not likely to adversely affect, the lesser long-nosed bat, based upon the following:

- The three current or former roost sites within the boundary of the Santa Catalina Ranger District are within Sonoran desert scrub habitat that is excluded from treatment. Additionally, the three current of former roost sites in adjacent areas are beyond one mile from the forest boundary and are outside proposed treatment areas. Design criteria for caves and mines of unknown occupancy will be determined on a site-by-site basis, including making efforts to preserve vegetation around cave entrances and potentially using fuel reduction buffer areas to protect such vegetation. Therefore, potential direct effects to lesser long-nosed bats from fire and other management activities are discountable.

- Aerial or ground application of retardant or foam will be restricted within 300 feet of caves and abandoned mines, and water will be used instead. Therefore, potential direct effects to roosting lesser long-nosed bats caused by retardant or foam use are discountable.

- Creating public access to known roosts during fire operations will be avoided. Therefore, potential direct effects to lesser long-nosed bats at these roosts through disturbance are discountable.

- Site-specific treatments using low-moderate severity prescribed fire will be planned to minimize adverse effects to lesser long-nosed bat forage plants and roosts. This includes staging areas for fire crews and helicopters in previously disturbed sites, if possible; and avoiding driving off road and over plants in stands of agave, piling slash on top of forage plants, and burning on or near plants. Additionally, all crew bosses (prescribed fire and vegetation treatments) will be instructed in the identification of agave and the importance of their protection for bats, and resource advisors will be present or available during prescribed fire and vegetation treatments to coordinate lesser long-nosed bat concerns. Therefore, potential indirect effects (reduced foraging habitat) for lesser long-nosed bats due to fire and other management activities are insignificant.

Gila topminnow

Historically, the Gila topminnow was abundant in the Gila River drainage in Arizona and was one of the most common fishes of the Colorado River basin. Gila topminnows were also recorded from the Gila River basin in New Mexico. Presently, only 8 of the 16 known natural Gila topminnow populations are considered extant (USFWS files).

General topminnow habitat includes quiet, warm waters with slow current and abundant aquatic vegetation. However, topminnow can survive in swiftly flowing streams with vegetation providing adequate cover (USFWS files).

In August of 2015, 540 Gila topminnow were reestablished into Sabino Creek; this was a cooperative effort between AGFD, USFWS, and the CNF. Subsequent monitoring of the population in 2016 and 2017 has shown that the species persists in the canyon; however, the numbers captured during surveys are less than expected. The population has moved downstream from the original release site where water is very limited during the dry season. Limited water availability along with predation from the Gila chub may be affecting establishment of the species in Sabino Canyon (Kent Mosher, Arizona Game and Fish fisheries biologist, pers. comm. 6-14-2017).

Conclusion

We concur with your determination that the proposed action may affect, but is not likely to adversely affect, Gila topminnow based on the following reasons:

- Site-specific implementation plans will specify fire management objectives and prescribed burning guidance, taking into account the special concerns related to Gila topminnow (including the spatial scale of treatments relative to the distribution of Gila topminnow and reducing the effects of peak flow change on stream channels). Resource advisors also will be consulted regarding all treatments, prescribed burning activities, fire management (e.g., control lines), and rehabilitation in riparian corridors. Additionally, damage to stands of native vegetation and soils from planned or unplanned fire operations will be minimized, and all age classes of riparian species will be retained. As much as possible, large, downed woody materials and snags that are not a hazard to firefighters will be retained. In riparian areas, natural barriers, openings in riparian vegetation, or topographic features will be used where possible as the easiest, safest

method to manage prescribed fire. In addition, placement of prescribed fire support sites (e.g., camps, staging areas and, refueling sites) will be outside riparian areas or river/stream corridors. Furthermore, heavy mechanical equipment use will be minimized in wet riparian drainages and on wet upland soils. Also, waterbars will be constructed in firelines (especially on steep hillsides) and sufficient groundcover will be retained to prevent erosion of the burned site, and intense prescribed fire will be avoided on sensitive soils to prevent water repellency, nutrient leaching, and erosion. Therefore, potential direct and indirect effects to the Gila topminnow and its habitat from fire and other management activities are insignificant.

- Fire retardant or chemical foam use in riparian habitats or within 300 feet of aquatic habitats will be avoided (Retardant Avoidance Zones). Therefore, potential direct effects to the Gila topminnow and its habitat caused by retardant or foam use are discountable.

- Water from sources supporting Gila topminnow will not be used for fire abatement. Unused water from prescribed fire activities will not be dumped in sites occupied by Gila topminnow to avoid introducing non-native species, diseases, parasites, or pollutants. If water is drafted from a stock tank or other body of water for prescribed fire activities, it will not be refilled with water from another tank, lake, or other water source that may support non-native fishes, bullfrogs, crayfish, or salamanders. Only water drawn from a municipal water supply or well water will be used to refill stock tanks. Additionally, containment systems for portable pumps to avoid fuel spills in riparian or aquatic systems will be required. Therefore, potential direct and indirect effects to Gila topminnow and its habitat from water use during fire and other management activities are discountable.

Gila chub and critical habitat

Gila chub commonly inhabit pools in smaller streams, cienegas, and artificial impoundments ranging in elevation from 2,000 to 3,500 feet. Gila chub are highly secretive, preferring quiet deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs. Adults are often found in deep pools and eddies below areas with swift currents. Young-of-the-year inhabit shallow water among plants or debris, while older juveniles use higher velocity stream areas. The historical range of the chub likely included suitable habitat throughout the entire Gila River basin, except the Salt River drainage above Roosevelt Lake. While the Gila chub has been recorded in approximately 30 rivers, streams, and spring-fed tributaries throughout the Gila River basin in southeastern Arizona, only 29 populations of Gila chub remain; all but one are small, isolated, and threatened.

In Sabino Canyon, 6.9 miles of Sabino Creek extending from the southern boundary of the CNF upstream to its confluence with the West Fork of Sabino Canyon is critical habitat. Sabino Canyon and the Gila chub population located there were devastated by the Aspen Fire in July 2003. This population would have been extirpated were individual fish not salvaged by the USFWS, AGFD, and the CNF, and reestablished in 2005 with approximately 350 Gila chub from the salvaged stock. Sabino Canyon contains one or more of the primary constituent elements of critical habitat, including perennial pools and adequate water quality.

Conclusion

We concur with your determination that the proposed action may affect, but is not likely to adversely affect, Gila chub and its critical habitat based on the following reasons:

- Site-specific implementation plans will specify fire management objectives and prescribed burning guidance, taking into account the special concerns related to Gila chub and its critical habitat (including the spatial scale of treatments relative to the distribution of Gila chub and reducing the effects of peak flow change on stream channels). Resource advisors also will be consulted regarding all treatments, prescribed burning activities, fire management (e.g., control lines), and rehabilitation in riparian corridors. Additionally, damage to stands of native vegetation and soils from planned or unplanned fire operations will be minimized, and all age classes of riparian species will be retained. As much as possible, large, downed woody materials and snags that are not a hazard to firefighters will be retained. In riparian areas, natural barriers, openings in riparian vegetation, or topographic features will be used where possible as the easiest, safest method to manage prescribed fire. In addition, placement of prescribed fire support sites (e.g., camps, staging areas and, refueling sites) will be outside riparian areas or river/stream corridors. Furthermore, heavy mechanical equipment use will be minimized in wet riparian drainages and on wet upland soils. Also, waterbars will be constructed in firelines (especially on steep hillsides) and sufficient groundcover will be retained to prevent erosion of the burned site, and intense prescribed fire will be avoided on sensitive soils to prevent water repellency, nutrient leaching, and erosion. Therefore, potential direct and indirect effects to the Gila chub, its habitat, and its critical habitat from fire and other management activities are insignificant.

- Fire retardant or chemical foam use in riparian habitats or within 300 feet of aquatic habitats will be avoided (Retardant Avoidance Zones). Therefore, potential direct effects to the Gila chub, its habitat, and its critical habitat caused by retardant or foam use are discountable.

- Water from sources supporting Gila chub will not be used for fire abatement. Unused water from prescribed fire activities will not be dumped in sites occupied by Gila chub to avoid introducing non-native species, diseases, parasites, or pollutants. If water is drafted from a stock tank or other body of water for prescribed fire activities, it will not be refilled with water from another tank, lake, or other water source that may support non-native fishes, bullfrogs, crayfish, or salamanders. Only water drawn from a municipal water supply or well water will be used to refill stock tanks. Additionally, containment systems for portable pumps to avoid fuel spills in riparian or aquatic systems will be required. Therefore, potential direct and indirect effects to Gila chub, its habitat, and its critical habitat from water use during fire and other management activities are discountable.

Appendix B: Treatment Units

Proposed treatments for 95 treatment units in the Catalina-Rincon Firescape Project by geographical group (copied from Table 3 in the Biological Assessment).

Treatment Unit / Size (acres)	Wildland Fire (natural and planned ignitions)	Prescribed Cutting/ Wildland Fire	Mastication / Wildland Fire	Total acres available for treatment	Acres excluded from treatment	Acres of Wilderness treatment
Northeast Group						
Alder / 6,123	6,007	116(1)	0	6,123	0	0
Buehman / 2,303	2,303	0	0	2,303	0	0
Burro / 2,884	2,758	0	58(1)	2,816	68	0
Crystal / 1,149	1,023	126	0	1,149	0	0
Davis Mesa / 349	349	0	0	349	0	0
Diablo / 5,399	5,209	190(1)	0	5,399	0	0
Geesman / 663	663	0	0	663	0	0
Gibb / 209	209	0	0	209	0	0
Horse Camp / 410	335	75	0	410	0	0
Iron / 4,857	4,689	0	0	4,689	168	0
Juanito / 711	711	0	0	711	0	0
Leopold / 3,674	3,328	346	0	3,674	0	0
Lower Straton / 2,195	2,045	150(1)	0	2,195	0	0
Marble / 353	156	197(1)	0	353	0	0
Peck / 1,401	1,401	0	0	1,401	0	0
Pigeon / 652	652	0	0	652	0	0
Quail / 182	111	71(1)	0	182	0	0
Split / 39	39	0	0	39	0	0
Upper Stratton / 1,147	1,145	2(1)	0	1,147	0	0
Oracle Group						
American Flag / 1,323	0	0	1,323	1,323	0	0
Campo Bonito / 1,557	323	0	1,234	1,557	0	0
Coronado Camp / 2,461	2,407	54(1)	0	2,461	0	0
Dodge / 2,100	1,825	0	275	2,100	0	0
North East / 474	0	0	474	474	0	0
Oracle Hill / 895	772	0	123	895	0	0
Peppersauce / 1,028	476	29(1)	523	1,028	0	0
Rice Peak / 4,069	2,922	1,038(1)	109	4,069	0	0
Triangle Y / 552	0	0	552	552	0	0
Tucson Wash / 613	0	0	613	613	0	0
Cañada del Oro Group						
Cargodera / 3,242	2,694	1	0	2,695	547	409
Cherry / 1,924	1,130	27(1)	0	1,157	767	0
Copper Hill / 758	758	0	0	758		
Gap / 3,641	3,080	93(1)	0	3,173	468	0
Irene / 208	207	0	0	207	1	0
Mill / 254	254	0	0	254	0	0
Mule Ear / 3,693	3,623	70(1)	0	3,693	0	0
NW Gap / 1,338	4	0	13	17	1,321	0
Pig / 450	450	0	0	450	0	0
Pinal / 764	135	0	0	135	629	0
Red Ridge / 1,237	1,087	150	0	1,237	0	0
Reef / 4,511	3,533	978	0	4,511	0	0
Samaniego / 4,965	2,977	28	0	3,005	1,960	0
Wild Cow / 2,716	2,689	27(1)	0	2,716	0	0
Mountain Top Group						
Bear Wallow / 291	17	274	0	291	0	0
Bigelow / 221	4	217	0	221	0	0
Green Mountain / 785	414	371	0	785	0	0
Hwy Fuel Break 1 /295	42	253	0	295	0	0
Hwy Fuel Break 2 / 423	62	361(1)	0	423	0	0
Sollers / 1,053	50	1,003	0	1,053	0	1

Treatment Unit / Size (acres)	Wildland Fire (natural and planned ignitions)	Prescribed Cutting/ Wildland Fire	Mastication / Wildland Fire	Total acres available for treatment	Acres excluded from treatment	Acres of Wilderness treatment
Spencer / 628	124	504	0	628	0	0
Summerhaven / 871	335	536	0	871	0	0
Northwest Group						
Baby Jesus / 1,894	4	342	0	346	1,548	0
Catalina Fuel Break / 4,404	4	2057	0	2,061	2,343	0
Sutherland / 552	0	4	0	4	548	29
Redington Group						
Agua Caliente / 11,157	8,308	1,188(1)	0	9,496	1,661	0
Alambre / 2,367	2,067	300(1)	0	2,367	0	0
Buckhorn / 5,054	4,444	610(1)	0	5,054	0	0
Bug / 4,118	3,703	415(1)	0	4,118	0	0
Bullock Spring / 3,010	2,713	297(1)	0	3,010	0	0
Chimney / 6,029	5,305	724(1)	0	6,029	0	0
Guthrie / 4,372	4,176	196(1)	0	4,372	0	0
Milagrosa / 3,256	1,987	171(1)	0	2,158	1,098	0
Piety / 2,407	1,856	168(1)	0	2,024	383	0
Portoritas / 5,321	4,005	769(1)	0	4,774	547	0
Tanque Verde / 1,360	802	318(1)	0	1,120	240	0
Rincon Group						
Bear / 575	510	65(1)	0	575	0	
Boulder / 4,361	4,218	143(1)	1	4,361	0	
Deer / 5,125	5,122	3(1)	0	5,125	0	5,080
Distillery / 16,115	12,939	0	0	12,939	3,176	11,937
Eagle Peak / 404	358	46(1)	0	404	0	
Fox / 2,581	1,979	0	0	1,979	602	1,979
Hidden / 6,435	6,266	169(1)	0	6,435	0	
Mesquite / 1,866	1,725	141(1)	0	1,866	0	
North Slope / 5,414	5,103	311(1)	0	5,414	0	3,091
Rincon Peak / 3,628	3,244	230(1)	154	3,628	0	2,477
San Juan / 3,124	3,034	90(1)	0	3,124	0	
Tres Pipas / 8,448	8,434	14(1)	0	8,448	0	7,681
Turkey Creek / 1,688	1,613	75(1)	0	1,688	0	1,237
Pusch Ridge Wilderness Group						
Buster / 3,558	1,279	0	0	1,279	2,279	1,279
Cathedral / 4,328	4,258	0	0	4,258	70	4,258
Finger / 2,899	2,165	0	0	2,165	734	2,165
Geronimo / 2,896	2,688	0	0	2,688	208	2,686
Gibbon / 6,608	4,714	244	0	4,958	1,650	4,316
Huntsman / 343	339(2)	5	0	343	0	342
Lemmon Creek / 7,365	7,364	1	0	7,365	0	7,364
Lemmon Rock / 589	554(2)	35	0	589	0	547
Mashall Saddle / 127	117(2)	10	0	127	0	125
Mud Spring / 2,805	2,792	13	0	2,805	0	2,761
Pontatoc / 3,381	2,394	0	0	2,394	987	2,394
Pusch / 3,724	1,694	0	0	1,694	2,030	1,690
Quartzite / 1,019	984	35	0	1,019	0	982
Rattlesnake / 7,545	6,141	0	0	6,141	1,404	5,876
Romero / 4,937	2,857	2	0	2,859	2,078	2,696
Sycamore / 5,933	5,075	858	0	5,933	0	4,417
Thimble / 2,891	1,899	0	0	1,899	992	1,875

(1) Some or all of Proposed Cutting acres are treated through 300-foot fuelwood area adjacent to roads
(2) One-chain shaded fuelbreak (66 feet)
(3) Fuelwood collection proposed as a secondary treatment to remove wood from mastication, grubbing or prescribed cutting treatment.

Appendix C: Design Features

Specific design features to eliminate or reduce adverse effects of the Catalina-Rincon Firescape Project on sensitive resources (modified from Appendix B of the Environmental Assessment; USFS 2016).

Resource	Design Feature
Number	**Prescribed Fire Design Features to Protect All Resources**
A-1	A prescribed burn plan would be developed according to agency standards and approved prior to initiating any burning operation.
A-2	Off-road vehicle activity during fire activities would be kept to a minimum. Vehicles would be parked as close to roads as possible, and vehicles would use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, local fire-fighting units should go off-road first because of their prior knowledge of the area.
A-3	No permanent or temporary road construction would be allowed. Any skid trails and off highway vehicle trails resulting from proposed activities would be obliterated and restored.
A-4	Areas of significant human activity during prescribed fire operations, such as fire crew camps and equipment staging areas, would not be located on or adjacent to sensitive sites such as habitat of protected species or archaeological sites. Such activities should also be kept to the minimum area possible and should be located in previously disturbed sites whenever possible.
Number	**Air Quality**
AQ-1	Fire managers would cooperate with other Federal, State and local regulatory agencies to protect air quality as required by the Clean Air Act and State and local regulations.
AQ-2	**Fire Treatments** a) To reduce smoke emissions or minimize smoke impacts, land managers are required to implement as many Best Management Practices (BMPs) as are feasible for their burn projects (ADEQ Instruction Guide for Completing the Arizona Department of Environmental Quality ADEQ Burn Plan Form). b) Basic smoke management practices (BSMPs) applied on prescribed fire can mitigate the impacts of smoke to public health, public safety and nuisance, and visibility. The USDA Forest Service and Natural Resources Conservation Service have created a Technical Note that outlines a suite of basic smoke management practice options that a fire manager can use to reduce the impacts of smoke from prescribed fires (USDA Forest Service and Natural Resource Conservation Service 2011). c) The publication “Smoke Management Guide for Prescribed and Wildland Fire” (PMS 420-2) provides more information on managing smoke and is available on the NWCG Web site. d) Notify potentially affected communities, other agencies, fire departments, etc., in advance of and during the burn activities.
Number	**Vegetation and Fuels**
V-1	Where necessary, in prescribed cutting units proposed for prescribed burning, activity slash would be pulled out from around leave trees to minimize damage.
V-2	Prescribed cutting activities in forest and woodlands EUs will be conducted under a detailed silvicultural prescription following the general silvicultural prescriptions in the appendix of the Vegetation Specialist Report. The detailed prescription will be tailored to push current condition toward the Desired Conditions over time.

Resource	Design Feature
V-3	For burns designed to reduce encroachment of woody species into grassy areas, plans and prescriptions would also address maintenance of native, perennial grasses and reducing the spread of invasive exotics.
V-4	In Madrean Pine-oak Woodlands, Ponderosa Pine Forest and Mixed-Conifer Forests EUs, Northern Goshawk Restoration Principles (RMRS-GTR-310) will be followed unless treatment unit is within Mexican Spotted Owl PAC or in Identified MSO Recovery Habitat
V-5	In Madrean Pine-Oak Woodland, Ponderosa Pine Forests or Mixed-Conifer Forests that are within Mexican Spotted Owl PAC or in Identified MSO Recovery Habitat, MSO Recovery Plan Management Recommendations will be followed unless modified under USFWS consultation.
V-6	Where necessary, in prescribed cutting units proposed for prescribed burning, activity slash would be pulled out from around leave trees to minimize damage.
Number	**Range**
R-1	Coordination with Allotments - To ensure success of burning operations, it is imperative to coordinate plans with grazing permittees. Area to be burned must receive a minimum of one complete growing season rest prior to the burning period to ensure fine fuels are present to carry the fire. Burned areas must receive at least one complete growing season rest to ensure plant recovery and soil protection. If the first summer is dry, livestock will not enter a burned pasture until a second full growing season has passed. A growing season is the period from July to September every summer when peak herbaceous plant growth occurs.
R-2	Infrastructure Compensation - Management burns must provide for protection or replacement of range infrastructure (e.g., fences, pipelines, water storage, etc.) Costs of replacement must be considered and planned for up front.
R-3	Prior to treatments; a site-specific evaluation is undertaken to determine the risk of loss, cost effectiveness of the improvement, and the cost of replacement for individual improvements.
Number	**Nonnative Invasive Plants**
IS-1	**Fire Planning** a) Increase invasive species awareness and invasive species prevention during project planning. Note that fires can increase soil nitrogen, decrease shade, and decrease competition from desirable plants – all conditions that favor invasive species invasion. b) Provide invasive species identification aids. c) For prescribed burns, inventory the project area and evaluate potential invasive species spread with regard to the fire prescription. Areas with moderate to high invasive species cover should be managed for at least two years prior to the prescribed burn to reduce the number of invasive species seeds in the soil. Vigilant invasive species management will be necessary after the burn. d) Ensure that an invasive species specialist is consulted during project planning in or near an infested area. e) Use operational practices to reduce invasive species spread. Avoid invasive species infestations when locating base camps, helibases, and staging areas and maintain them in an invasive species-free condition.

Resource	Design Feature
IS-2	**Fire Implementation** a) Ensure that all equipment has been thoroughly cleaned and is free of invasive species seed and propagules. b) Designate equipment-cleaning sites. Inspect and treat invasive species that establish at equipment-cleaning sites after fires. c) When possible, use tactics that reduce disturbances to soil and vegetation. d) Avoid moving water buckets from aquatic-invasive species-infested lakes to lakes that are not infested. There is no hazard in using water infested with aquatic invasive species on terrestrial sites. e) Given a choice of tactics, avoid ignition and burning in areas at high risk for invasive species establishment or spread.
IS-3	**Fire Rehabilitation** a) To prevent invasive species spread, treat invasive species in burned areas. Invasive species can recover as quickly as two weeks following a fire. b) Invasive species-free or relatively invasive species-free burned areas should be monitored for invasive species the following growing season. c) Determine soon after a fire whether revegetation is needed to speed recovery of a competitive plant community, or whether desirable plants in the burned area will recover naturally. Consider the severity of the burn and the proportion of invasive species to desirable plants on the land before it burned. In general, more severe burns and higher pre-burn invasive species cover increase the necessity of revegetation. Consider revegetating an area if the desired plant cover is only 20 to 30%. Use certified invasive species-free seed mixes. d) Monitor, document, and treat invasive species at fire access roads, cleaning sites, fire lines, staging areas, and within burned areas.
Number	**Wildlife, Fish and Plants**
WFP-1	Resource advisors would be consulted regarding all treatment and prescribed burning activities. They would also be responsible for coordination with the agencies on federally listed and other sensitive species. They would monitor fire and vegetation management activities to ensure the protective measures are implemented.
WFP-2	Resource advisors should coordinate site-specific burn and implementation plans with the U.S. Fish and Wildlife Service and Arizona Game and Fish Department to identify site-specific measures to protect federally listed and sensitive species, and species of concern.
WFP-3	Implementation activities in habitats of threatened, endangered, sensitive species, and/or species of concern will include oversight or coordination with wildlife staff. Coordination may include training of crews in: the identification of sensitive species; avoidance of impacts to sensitive species (e.g., identification and avoidance of wildlife use/habitat elements, such as nests, cavities, and woodpecker foraging holes); notification of the appropriate agencies (i.e., AGFD or USFWS) if a sensitive, threatened, or endangered species is encountered; and that individuals must not be picked up or removed without a permit.
WFP-4	Prescriptions (particularly timing and intensity of burn) for projects within or adjacent to suitable habitat for federally listed and sensitive plant populations shall be designed to maintain or improve the existing population or habitat.
WFP-5	Retention areas will emphasize hiding, escape, bedding and thermal cover around feeding and watering areas, in drainages, and along roads.
WFP-6	Minimize mechanical disturbance of soils to reduce the impact of habitat manipulation on small mammal and reptile communities

Resource	Design Feature
WFP-7	Nesting birds and sensitive plants: consult with local biologist for species and site-specific guidance when developing burn/implementation plans, especially for fire treatments outside the normal natural fire season.
WFP-8	Within a calendar year consider the spatial scale of treatments relative to distribution of individual species of concern (e.g., the proportion of habitat treated) in the planning area when implementing project(s).
WFP-9	The spatial distribution and contiguous size of planned burn/treatment areas would be considered in order to reduce the effects of peak flow change on stream channels.
WFP-10	When constructing slash piles, avoid agave and any known sensitive plant populations
WFP-11	Maintain noise buffers around project areas during the raptor-nesting season (e.g., equipment operation shall not cause increase in noise levels at raptor nests and roost sites above 55 decibels.)
WFP-12	**Northern (Apache) Goshawk:** a) Human activity should be limited in goshawk nesting areas and post-fledging family areas (PFA) during the breeding season, March 1 through September 30. b) Within nesting areas and PFA, maintain existing canopy cover levels. Within adjacent woodlands outside PFA, manage for uneven-age stand conditions to sustain a mosaic of vegetation densities (overstory and understory), age classes, and species composition well distributed across the landscape. Provide for reserve trees, snags, down woody debris. c) Low intensity surface fires may be used in a PFA at any time but avoid burning the entire PFA in a single year. Prescribed fire within nesting areas should be planned to move with prevailing winds away from the nest tree to minimize smoke and risk of crown fire developing and driving the adults off or consuming the nest tree.
WFP-13	**Mexican Spotted Owl (MSO) Habitat:** Prescribed fire (preferably low to moderate-intensity) would be used to maintain and enhance MSO habitat inside and outside of the protected activity centers by varying the management prescriptions to: a) reproduce natural disturbance patterns; b) maintain native vegetation in the landscape, including early seral species; c) allow natural gap processes to occur, thus producing horizontal variation in stand structure; d) promote the growth of additional large oaks and pines by thinning out understory vegetation through the use of moderate-intensity burning and by pretreating large trees (ringing, foam, limbing); e) reduce fuels to promote future low to moderate-intensity fire in protected activity centers and adjacent areas.
WFP-14	Ensure that potential Mexican Spotted Owl nests and protected and recovery (formerly called restricted) habitat are protected to the greatest extent feasible as documented in the project's silvicultural prescription are implemented as proposed. Limited operating periods for MSO inside of protected activity centers (PAC) is March 1 – August 31. Within a Mexican spotted owl protected activity center, treatments shall only occur during the nonbreeding season of September 1 through February 28.

Resource	Design Feature
WFP-15	**Protected Activity Centers:** a) Treat fuel accumulations to abate fire risk. b) Within each selected PAC, the core area (a designated 40 ha (100 acres) centered around the nest site) will be treated with a light burning of ground fuels. Within the remaining PAC, light burning of ground fuels may be allowed within the 500 acres surrounding the 100-acre PAC cores. c) Treatments can occur only during the non-breeding season (September 1 - February 28) to minimize any potential deleterious effects on the owl during the breeding season. d) Resource advisors would be consulted when making decisions about prescribed fire activities. Advisors would be notified if Mexican spotted owls are discovered during fire operations. e) Prescribed fire and mechanical thinning treatments would be conducted to minimize effects on reproduction; actions with known potential for negative effects to Mexican spotted owl and its habitat (protected and reserve) would be avoided. f) Guidelines, listed below, of the Mexican Spotted Owl Recovery Plan shall be followed within all owl PACs: i) 100 acres around the nest site will be deferred from treatments except for Rx fire light. ii) Within the remaining 500 acres in the PAC treatment of fuels and prescribed fire can be used to reduce fuel hazard and to improve habitat conditions for owl prey. iii) Habitat components that should be retained or enhanced include large logs (>12 in.) midpoint diameter, grasses, forbs, and shrubs. iv) Light ground burning is allowed within the 500 acres surrounding the 100-acre PAC centers as well as the 100 acre core area. v) Upon completion of this project, owl PACs would be monitored for Mexican spotted owl occupancy and reproductive status. Protect large Gambel oaks and snags during mechanical and prescribed burning treatments.
WFP-16	Mechanically treat vegetation only on slopes less than 40%.
WFP-17	Retain all live trees greater than 24 inches d.b.h. Trees less than 24 inches d.b.h. would be thinned to the desired basal area levels for the project area. Favor retention of the healthy, larger diameter trees. Healthy trees are defined as vigorous, well-formed trees free of damaging insects and mistletoe.
WFP-18	The desired live crown ratio (ratio of crown height to total tree height) should exceed 40%. Smaller trees would be retained if they are healthier than the larger trees. If necessary, less desirable trees would be left to achieve desired basal area levels.
WFP-19	Retain 30 to 45 percent of large trees with d.b.h. 12 inches or larger
WFP-20	Construct no new roads. Access would be on, and from, existing travelways.
WFP-21	Retain desirable levels and distribution of large woody debris.
WFP-22	Retain all existing snags unless pose a threat to human health and safety.
Number	**Soil and Water**
SW-1	Waterbars would be constructed in firelines, especially on steep hillsides.
SW-2	Sufficient groundcover would be retained to prevent erosion of the burned site.
SW-3	Intense prescribed fire would be avoided on sensitive soils, to prevent water repellency, nutrient leaching, and erosion.
Number	**Riparian, Aquatic, and Wetland Areas**

Resource	Design Feature
RAW-1	Prescribed fire control actions in riparian areas should apply minimum impact suppression tactics to minimize damage to stands of native vegetation and soils from planned or unplanned fire operations.
RAW-2	To the extent possible, large, downed woody materials and snags that are not a hazard to firefighters would be retained. Large logs (12 inches diameter and greater and 8 feet or more long) should not be cut into sections.
RAW-3	Retain all age classes of riparian species (defined in FSM 2526, Riparian Watershed Management).
RAW-4	Fire management (e.g., control lines) and rehabilitation in riparian corridors would be coordinated with a Resource Advisor.
RAW-5	Site-specific implementation plans (e.g., Coronado National Forest Fire Management Plan) that include management areas with federally listed aquatic or riparian-obligate species would specify fire management objectives and prescribed burning guidance, taking into account the special concerns related to these species.
RAW-6	In riparian areas, natural barriers, openings in riparian vegetation, or topographic features would be used where possible as the easiest, safest method to manage prescribed fire.
RAW-7	Minimize use of heavy mechanical equipment in: • wet riparian drainages or • on wet upland soils if rutting greater than 3 inches is occurring
RAW-8	The use of fire retardants or chemical foams in riparian habitats or within 300 feet of aquatic habitats would be avoided; particularly sites occupied by federally listed species. Retardant Avoidance Zones will be followed.
RAW-9	Placement of prescribed fire support sites (e.g., camps, staging areas and, refueling sites) would be outside riparian areas or river/stream corridors.
RAW-10	Water from sources supporting federally listed species will not be used for fire abatement. Unused water from prescribed fire activities would not be dumped in sites occupied by federally listed aquatic species to avoid introducing non-native species, diseases, parasites, or pollutants.
RAW-11	If water is drafted from a stock tank or other body of water for prescribed fire activities, it shall not be refilled with water from another tank, lake, or other water source that may support non-native fishes, bullfrogs, crayfish, or salamanders. Only water drawn from a municipal water supply or well water shall be used to refill stock tanks- Use of containment systems for portable pumps to avoid fuel spills in riparian or aquatic systems would be required.
Number	**Caves and Mines**
CM-1	Design criteria for caves and mines will be determined on a site-by-site basis. Efforts will be made to preserve vegetation around cave entrances. Fuel reduction buffer areas may be desirable to protect such vegetation.
CM-2	Aerial or ground application of retardant or foam should be restricted within 300 feet of caves and abandoned mines, and water used instead, in accordance with the Interagency Standards for Fire and Aviation Operations.
Number	**Recreation**
Rec-1	**Notification** – Keep the public informed on project activity during implementation. This may include posting signs in developed sites, putting announcements on the CNF website, and writing a news release for media publication.
Rec-2	**Rehabilitation of recreation infrastructure** - Trail treads, roads, or facilities would be rehabilitated if damaged during project operations.

Resource	Design Feature
Rec-3	**Treatments within Developed Sites** - Vegetation treatments within developed sites would be coordinated with local recreation/facility managers to protect developments and lessen impacts to visitors' ability to use sites. Developed sites will be temporarily closed for visitor protection.
Rec-4	**Slash Disposal** - All slash and materials resulting from treatments within to recreation facilities, trails, or dispersed sites would be removed, as soon as feasible.
Rec-5	**Timing of Activities** - Project activities that occur within or adjacent to developed sites, dispersed sites, or trails would be conducted outside the major use season whenever possible. Portions of sites and trails may be temporarily closed for visitor protection.
Rec-6	Concentrate handlines on existing disturbed areas, such as roads and trails, and feather out vegetation disturbance.
Rec-7	Remove all staged supplies and equipment after implementation; avoid leaving any evidence of human activity in wilderness.
Rec-8	Clear brush around anodized aluminum plate trail signs, colored kiosk signs, wilderness boundary carsonite signs, developed recreation structures (e.g. restrooms, fee tubes) and communication sites.
Rec-9	Rehabilitate all constructed handlines and safety zones to pre-implementation condition at the completion of the burn.
Rec-10	Where possible, while implementing proposed treatments, make improvements within recreation sites and along trails. Examples include cleaning up logs and debris from past projects, removing hazards trees surrounding developed sites, and cutting existing stumps to less than six inches.
Rec-11	Prescribed cutting and burning treatments should avoid removing visual screening for developed and dispersed recreation sites.
Rec-12	When possible, in the immediate vicinity of developed campgrounds, cut downed trees into fuelwood lengths for on-site use.
Rec-13	Use Basic Smoke Management Practices to mitigate the impacts of smoke to public health, public safety and nuisance, and visibility.
Rec-14	When implementing fire treatments in wilderness, use Minimum Impact Suppression Tactics to preserve wilderness values to the greatest extent feasible.
Rec-15	When possible, minimize project activity on weekends and holidays and during seasons of high use, especially near high-use trails and recreation sites.
Number	**Scenery**

Resource	Design Feature
S-1	For vegetation management and forest health improvement projects (Forest Plan Guideline 4): a. Scenic integrity objectives may be temporarily lowered in the short term if necessary to meet project objectives, but should meet scenic integrity objectives over the long term. b. Vegetation management projects should avoid even spacing of retained trees, leave a diversity of tree species and sizes, avoid damage to vegetation that will remain, and naturalize disturbed areas. c. Prescribed slash treatment in the immediate foreground (up to 300 feet) of concern level 1 and 2 travelways should be completed as soon as conditions permit. d. Healthy large trees should be favored as a larger proportion of the immediate foreground along concern level 1 and 2 travelways, unless doing so would not achieve project goals. e. In the immediate foreground along concern level 1 and 2 travelways, stumps should be treated to reduce their visibility by methods such as cutting as low as possible (no more than 6 inches above ground on uphill side) and angling large stump faces away from viewing locations unless doing so would pose a safety hazard. f. Log decks should be removed, and actions should be taken to naturalize skid trails as soon as conditions permit.
S-2	Effects from prescribed fire should be considered during project planning and implementation. Blackened and scorched vegetation may be visible in project areas in the short term following treatments, but scenic integrity objectives should be met in the long term, though blackened trunks may remain visible (Forest Plan Guideline 5).
S-3	Activities that affect scenic quality should be scheduled outside of the major recreation season, unless doing so would not achieve project goals or would conflict with wildlife restrictions (Forest Plan Guideline 8).
S-4	Management Approach 3: Considering the use of interpretive signs at the site of vegetation treatments and natural disturbances to inform the public about the nature and consequences of such projects or events.
S-5	Avoid removing or burning vegetation that visually screens unsightly elements (especially buildings, administrative sites, and utility structures) or provides visual screening of roadways from developed and dispersed recreation sites unless doing so would not sufficiently reduce fire risks (e.g., Firewise treatments).
S-6	Minimize straight lines and geometric shapes to mimic natural patterns and blend treatment areas into surrounding vegetation.
S-7	Mark trees near roads and trails and recreation sites in a manner that minimizes long-term visual effects; consult with landscape architect to determine where this is an issue. When possible, use flagging and tags stapled to trees for boundary designation and for tree marking in high sensitive areas. If stump marks are to remain, keep them small and low and on the side away from highest viewing. Pull flagging when no longer needed.
S-8	Where possible, while implementing proposed treatments, make improvements within recreation sites and along trails. Examples include cleaning up logs and debris from past projects, tilling previously compacted soils, and cutting existing stumps lower.
S-9	Minimize the number of felled trees to remain on the ground. Where logs must be left, place them so that the cut end face away from viewing areas where possible.
S-10	In foreground areas, treat slash to meet long term scenery objectives wherever possible.
S-11	Brush-masticated slash (not including grubbed slash) should not exceed 6 inches in depth.

Resource	Design Feature
S-12	Obliterate all temporary roads and fire lines visible from system roads, trails, and recreation areas to prevent motorized travel after operations are complete. Naturalize all disturbed ground in these areas by restoring previous grades as necessary, then tilling and seeding with a Forest approved certified noxious weed free seed mix. Place cull logs and/or boulders where needed to discourage people from driving vehicles into new openings. Place boulders in a random, non-linear fashion and partially buried them to appear natural.
S-13	Vegetation Management Plans for developed recreation sites, though not required, are encouraged in some areas to provide additional direction for vegetation treatments in these areas. Treatments should be focused on providing high quality scenery, shade, and screening. Forest Health funds might be available to help implement treatments in these areas.
S-14	Use guidance from the Coronado National Forest Scenery Management System Implementation Guide (CNF 2014) and have the Forest Landscape Architect visit the site as the first few treatments are completed to determine whether adjustments in mitigation are needed or other recommendations become necessary. Adaptive management ideas might also be gleaned from other forest health projects on the Coronado NF that will be underway in upcoming years and will overlap in time with implementation of the Catalina-Rincon FireScape Project. These include the Oracle Ridge Ecosystem Restoration Project, Pinaleño Ecosystem Management Project, Huachuca FireScape, Galiuro FireScape, and Chiricahua-Dragoon FireScape.
Number	**Heritage**
H-1	**Any areas of intensive ground disturbance** will receive 100% survey (pre-field and on the ground), including but not limited to: - intensive mechanical treatments (including mastication and grubbing) - hand and mechanical fire line construction - staging areas, constructed safety zones - water bars and other constructed erosion control features - other actions such as constructing fuelbreaks
H-2	**Prescribed burns** - At a minimum, surveys for prescribed burn areas would include survey of locations likely to contain additional fire-sensitive sites, based on pre-field research, expected fire behavior, and other relevant data. Additional survey may be conducted at the agency archeologist's discretion. The survey strategy shall identify the types of sites that are considered fire-sensitive for each fuels reduction project, using the guidelines below. This should include both known fire-sensitive sites and other sites considered fire-sensitive for the specific area, based on fuel loading, site characteristics, and expected fire behavior.
H-3	**Prescribed cutting units** - Areas where machine piling or any other activity using mechanized equipment is planned would be surveyed 100 percent. Units where only hand thinning is planned, with no use of mechanized equipment and no follow-up prescribed burning, may or may not be surveyed at the discretion of the agency archeologist without prior State Historic Preservation Office (SHPO) consultation.
H-4	**Fuelwood sales -** Projects that affect 640 acres or less will be surveyed 100%. Projects that exceed 640 acres in size will be surveyed using a two-stage process. The initial survey stage will consist of surveying linear transects at ¼ mile intervals and all roadways that will be improved. Based upon a review of the data gathered in the initial survey stage, the Forest Archeologist may require a second stage of survey consisting of block survey of areas with a high probability of sites.

Resource	Design Feature
H-5	**Identifying fire-sensitive sites:** Archaeologists would use site assessment and monitoring data, and would consult with fire management staff, to identify known and other project-specific fire-sensitive sites for individual project areas, and to ensure that fire personnel are appropriately qualified and briefed on cultural resource fire management guidelines, or are supervised by a qualified cultural resource advisor. Fire-sensitive sites include sites with organic (combustible) elements and rock-art sites. Other sites may be fire-sensitive depending on the severity of the fire (e.g. buried cultural deposits). Fire-sensitive sites officially determined ineligible for the National Register of Historic Places (in consultation with the SHPO) do not require protection under Section 106. Of the known fire-sensitive site types, only historic sites with wooden elements and rock art sites have been identified within the project area.
H-6	**Treatment actions within or adjacent to site boundaries:** Various combinations of the following protection measures may be approved by the agency archaeologist to protect sites within wildland-urban interface and other large-scale hazardous fuels reduction projects. These guidelines are outlined in appendix J, sections I-III. The agency archaeologists may approve additional measures to further protect sites; however, if a lesser level of protection is recommended, or if it is likely that adverse effects cannot be avoided, the agency shall consult with the SHPO on a case-by-case basis.
H-7	**Prescribed Burning** • To protect fire-sensitive sites, the following mitigation measures will be used to remove or buffer sites from the fire: Hand line, Black line, Wet line, Foam retardant, Structural fire shelter • Remove heavy fuels from site by hand • Prevent ignition of in-situ heavy fuels that cannot be removed (e.g., flush-cut & bury stumps) • Implement same protective measures for future maintenance burns • Prescribed burning may be allowed on non-sensitive sites.
H-8	**Protect selected other sites (option)** • Allow burning over sites without fire sensitive features or materials: • No ignition points within site boundaries • No staging of equipment within site boundaries • Allow construction of safety zones and additional lines in 100% surveyed areas, with archaeological monitoring to assure recorded sites are avoided • Conduct post-fire monitoring (in accordance with inventory report)
H-9	**Prescribed cutting, Hand and Mechanical Treatments** - No prescribed cutting within site boundaries -or-allow prescribed cutting within site boundaries, provided: • Cutting is accomplished using hand tools only • Large-diameter trees are felled away from all features • Thinned material is hand carried outside site boundary • No use of mechanized equipment within site boundaries • No staging of equipment within site boundaries • No slash piles within site boundaries

Resource	Design Feature
H-10	**Fuelwood Sales** - No fuelwood cutting or vehicles within site boundaries, or: • Allow fuelwood cutting within sites, but do not allow vehicles within site boundaries • No dragging of logs, trees, or cut material across or within site boundaries • All materials removed from the site are removed by hand. • Allow fuelwood cutting in areas of continuous, low-density scatters, with the following recommendations; all features and artifact concentrations are recorded and avoided; use of vehicles are prohibited during wet ground conditions; and periodic monitoring is used to assess impacts and if impacts are noted, fuelwood cutting will be prohibited in the area.
H-11	**Newly Discovered Sites** - When previously unidentified cultural resources are discovered, or unanticipated detrimental impacts occur, all work would cease in the immediate vicinity and the appropriate heritage resource specialist would be notified.
H-12	**Chipping** – a chipper should not be placed within or immediately adjacent to an historic property or archaeologically sensitive sites. Spreading chips back across the site cannot cause ground disturbance.
H-13	**Lop and Scatter** – Lop and scatter using hand techniques is not considered ground disturbing provided no piling of downed material occurs. If mechanized equipment is used, the project area will require 100% survey
H-14	**Mastication/Grubbing** – Sites would be avoided during any mastication activities.
H-15	**Pile burning** – Pile burning would not be allowed within an historic property or archaeologically sensitive site boundaries.
H-16	**Prune and Hand-removal, thin by hand** – These methods would be allowable within site boundaries, as long as materials are not piled (i.e. scattered across the landscape)
Tribal Consultation	**Notification** - Prior to project-specific implementation, all applicable NEPA and 36 CFR 800 regulations regarding scoping and tribal consultation would be followed. In addition, Tribes would be notified of activities that may affect traditional practices, such as the gathering of beargrass or yucca. Appendix J, Stipulation 14(f)