



United States Department of the Interior

FISH AND WILDLIFE SERVICE



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August 23, 2021

Cons: # 02ENNM00-2019-F-1123

Debbie Cress, Forest Supervisor
U.S. Forest Service, Santa Fe National Forest
11 Forest Lane
Santa Fe, NM 87508

Dear Ms. Cress:

Thank you for your March 18, 2021, letter requesting formal consultation and conference 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 (ESA), for the U.S. Forest Service's Santa Fe National Forest Land Management Plan Revision (LMP or proposed action). Your letter included a biological assessment (BA), dated August 2020 and hereby incorporated by reference, which analyzed the effects of the proposed action on the federally listed Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat (CH), the Jemez Mountains salamander (*Plethodon neomexicanus*) and its CH, the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) and its CH, and the Holy Ghost ipomopsis (*Ipomopsis sanctispiritus*).

The Forest Service determined that the proposed project "may affect, is likely to adversely affect" the New Mexico meadow jumping mouse and its designated critical habitat, Jemez mountains salamander and its designated critical habitat, Mexican spotted owl and its designated critical habitat, and Holy Ghost ipomopsis. There is no designated critical habitat for the Holy Ghost ipomopsis; therefore, none will be affected.

Additionally, the August 2020 BA included determinations of "no effect" for a variety of species and associated CH. Although the ESA does not require Federal agencies to consult with the USFWS if the action agency determines their action will have "no effect" on threatened or endangered species or designated critical habitat (50 CFR 402.12), we appreciate your consideration for the conservation of these species and notification of your "no effect" determinations.

The attached biological opinion is based on the review of the proposed action and its effects on Federally-listed species and designated critical habitat in accordance with Section 7 of the ESA.

The biological opinion is based on information provided in the BA, correspondence with your staff, data in our files, a literature review, and other sources of information, including the final rules to list the previously mentioned species as threatened or endangered and designate critical habitat. Literature cited in the attached biological opinion is not a complete bibliography of all literature available on the species of concern, the project and its effects, or on other subjects considered in this opinion.

We appreciate your efforts to identify and minimize effects to listed species from the U.S. Forest Service's Santa Fe National Forest Land Management Plan Revision. For further information, please contact Chad Baumler of my staff at chad_baumler@fws.gov. Please refer to consultation number 02ENNM00-2019-F-1123 in future correspondence concerning this project.

Sincerely,

Shawn Sartorius
Field Supervisor

cc (electronic):

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Ecosystems Staff Officer, Santa Fe National Forest, Santa Fe New Mexico
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Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
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Biological Opinion for the Santa Fe National Forest

Land Management Plan Revision

New Mexico

02ENNM00-2019-F-1123

August 2021

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (USFWS) biological opinion concerning the effects of the U.S. Forest Service's Santa Fe National Forest Land Management Plan Revision, in accordance with section 7 of the Endangered Species Act of 1973 (16 USC 1531-1544), as amended (ESA).

A biological opinion (opinion) is a document that states the opinion of the USFWS as to whether a federal action is likely to jeopardize the continued existence of listed or proposed species or result in the destruction or adverse modification of designated or proposed critical habitat.

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02). "Destruction or adverse modification" is defined as a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 CFR § 402.02; 84 FR 44976-45018). Please note that primary constituent elements (PCEs) of critical habitat are now referred to as physical and biological features (PBFs) based on the final rule implementing changes to regulations for designating critical habitat (81 FR 7414-7440). To maintain consistency with the final rules designating critical habitat for the Mexican spotted owl (*Strix occidentalis lucida*), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), and Jemez Mountains salamander (*Plethodon neomexicanus*), this opinion will use the term PCEs.

The USFWS received your request for formal consultation with your August 2020 Biological Assessment (BA) for the U.S. Forest Service's (USFS) Santa Fe National Forest (Forest) Land Management Plan (LMP or plan) Revision (proposed action) on March 19, 2021. The Forest determined that the proposed action "may affect, is likely to adversely affect" the Mexican spotted owl ("owl" or "MSO") and its designated critical habitat (CH), the Jemez Mountains salamander ("salamander" or "JMS") and its designated CH, the New Mexico meadow jumping mouse ("mouse" or "NMMJM") and its designated CH, and the Holy Ghost ipomopsis (*Ipomopsis sanctispiritus*) ("HGI"). There is no designated CH for the Holy Ghost ipomopsis.

This opinion is based on the USFWS's review of the proposed action and its effects on the listed species in accordance with Section 7 of the ESA. The opinion is based on information provided in the submitted BA, correspondence with your office, data in our files, a literature review, and other sources of information including the final rules to list the species as threatened or endangered and designate critical habitat. Literature cited in the opinion is not a complete bibliography of all literature on the species of concern, the project and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at the New Mexico Ecological Services Field Office (NMESFO).

CONSULTATION HISTORY

From 1985 to 1988, each of the 11 National Forests (NFs) in the Southwestern Region developed and approved Land Management Plans (LMP) pursuant to the National Forest Management Act of 1976 (NFMA). The USFWS issued a non-jeopardy/no adverse critical habitat modification opinion on each of the USFS LMPs for all federally listed species.

On April 15, 1993, the MSO was listed as threatened. On September 6, 1995, the USFS requested initiation of formal consultation on the 11 NF Plans for effects on the MSO.

On May 14, 1996, the USFWS issued a Biological Opinion (BO) on the 11 LMPs, which concluded jeopardy to the MSO and adverse modification for its designated CH (U.S. Fish and Wildlife Service 1996a). The USFWS's Reasonable and Prudent Alternative to the existing LMPs advised the USFS to implement the 1995 Recovery Plan for the MSO. This opinion was litigated in U.S. District Court because it did not quantify incidental take for the MSO. On November 25, 1996, the USFWS issued another final jeopardy BO that included incidental take for the MSO pursuant to a September 17, 1996, Court Order. Also, on November 25, 1996, the USFWS issued a BO on the USFS's June 1996 Regional Amendment to the LMPs for the MSO. The 1996 Regional Amendment directs the implementation of the Recovery Plan for the MSO, as well as guidelines for the northern goshawk and old-growth management. The USFWS concluded non-jeopardy for the MSO and no adverse modification of its designated CH (U.S. Fish and Wildlife Service 1996b).

On April 5, 2004, the USFS requested re-initiation of formal consultation under section 7 of the ESA on the 1996 MSO opinion and the 1997 opinion for all other federally listed species on the 11 NFs. The USFS provided the USFWS with the final BA for the Continued Implementation of the LMPs for the 11 NFs and National Grasslands (NG) of the Southwestern Region.

On May 26, 2004, the USFWS responded to the USFS, acknowledging formal consultation had been initiated.

On June 10, 2005, the USFWS provided USFS with a final programmatic LMP opinion (Cons. # 2-22-03-F-366).

On April 9, 2011 the Santa Fe NF requested re-initiation of consultation on the Forest Service's continued implementation of the LMP for the 11 Southwestern National Forests and National Grasslands.

On March 30, 2012, the U.S. Fish and Wildlife Service issued a Biological Opinion (Consultation Number 2012-F-0010) titled "The Continued Implementation of the LRMP for the Santa Fe National Forest of the Southwest Region".

A Consultation Agreement (CA) between the USFWS and USFS for the revision of the Forest LMP was signed on November 21, 2018, that addressed timeframes, staffing, and a dispute resolution process .

On July 16, 2019, the USFWS Information for Planning and Consultation (iPaC) website was used to formally request and receive an official species list for the Santa Fe NF administrative forest boundary area (02ENNM00-2019-F-1123).

On August 22, 2019, USFWS, Santa Fe NF, Cibola NF, and Carson NF held a joint meeting to discuss Forest Plan consultation approaches and timelines.

On August 26, 2020, USFS sent a draft BA to the USFWS for their review and comments.

On November 17, 2020, USFWS sent the draft BA back to the USFS with comments.

On March 19, 2021, USFS sent the revised BA to the USFWS and requested formal consultation.

On July 29, 2021, USFWS sent the draft biological opinion to the USFS for review.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Description of Proposed Action

The proposed action described below is a “framework programmatic action” as defined in 50 CFR 402.02, where the framework programmatic action only establishes a framework for the development of specific future action(s) but does not authorize any future action(s). The effects to listed species and designated critical habitat of future actions that are subsequently authorized, funded, or carried out under this program will be addressed in subsequent section 7 consultation, as appropriate.

The proposed action is the implementation of the management direction provided within the revised Land Management Plan (LMP). The proposed LMP provides Forest-level direction to meet the Forest Service’s mission for program management activities. It is designed to address needs for restored forested and non-forested vegetation, incorporating natural wildfires, terrestrial and aquatic wildlife habitat, improved riparian management zones, watershed health, improved rangeland forage and infrastructure, sustainable recreation, and desires for recommended wilderness and other special areas. This LMP maintains current levels of use while improving infrastructure and increasing the level of restoring ecological health. It is largely strategic in nature but does address types of activities to be conducted on the Forest. The proposed LMP does not specifically authorize individual projects or activities. Site-specific actions will be subject to future and separate Endangered Species Act (ESA) section 7(a)(2) consultations.

Also established in the revised plan are objectives, standards, and guidelines for management activities related to many (but not all) specific elements and/or management areas. There are also suggested management approaches for achieving desired conditions. This combination of direction is intended to give a complete picture of desired outcomes and the tools to attain them. It also provides direction for ways to address threats such as invasive species, excessive fuel

loading, and climate change, within the authority of the Forest Service. The planning period for the proposed LMP is for 10 - 15 years immediately following LMP approval or until the LMP is revised, whichever applies. The proposed LMP includes the following types of direction (i.e., plan components and decisions):

Desired conditions -- express an aspiration, often to achieve long-term ecosystem restoration and resiliency. They form the basis for projects, activities, and uses that will occur under the LMP. Site-specific projects will be designed to maintain or move towards desired conditions over the long term. Desired conditions provided in the proposed LMP include important ecosystem components including airsheds, watersheds, vegetation, aquatic and terrestrial wildlife, as well as social and cultural resources including recreation, wilderness, scenic beauty, open space, transportation system, and public access and use opportunities for the Forest.

Objectives -- are the short-term mechanisms to reach desired conditions over the long-term. Objectives have two parts: a quantifiable outcome and a time in which to achieve the outcome. There is intent to meet the outcome of objectives during the planning period. Although they are considered realistic short-term goals, there may be unforeseen operational, logistical, environmental, political, or financial considerations that may influence the outcome. To accommodate potential uncertainty, there is a stated range of values for the outcome (e.g., acres treated during the proposed action period).

Standards -- set sideboards on the achievement of desired conditions and objectives by setting requirements to limit or guide Forest uses or activities that are expected to occur under the LMP. Standards are activity or project design constraints that must be followed. Thus, standards are mandatory constraints on project and activity decision-making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

Guidelines -- set sideboards on the achievement of desired conditions and objectives by setting requirements to limit or guide Forest uses or activities that are expected to occur under the LMP. Guidelines allow for some variance from the exact wording, as long as the intent of the guideline is met. Guidelines are established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

Suitability determinations -- describes the appropriateness of applying certain resource management practices to a particular area of land. Suitability is determined based on compatibility with desired conditions and objectives in the plan area. These relay information about proposed land use activities.

Management area and special designations, or recommendations for special designations, identify areas with differing desired conditions, uses, standards, and/or guidelines than Forest-wide plan direction. Examples include wilderness, botanical areas, and wild and scenic rivers. Management can occur in these areas, so consultation applies to management actions in these areas addressed in the LMP.

Management Approaches are not plan components but help clarify how plan direction may be applied and identify probable management actions that are designed to maintain or move towards desired conditions and objectives. Management approaches describe the priorities and expectations for future program coordination. Partnerships and collaborative arrangements are also included as part of the management approaches for accomplishing desired conditions. Management approaches are strongly influenced by recent trends, past experiences, anticipated staffing levels, and short-term budgets. Decisions about what projects are actually proposed and approved, as well as details of project design, are determined by public involvement, science, and professional experience at the project or activity level.

Monitoring and evaluation are not plan components but are requirements for LMP implementation. They are used to determine the degree to which on-the-ground management is maintaining or making progress toward desired conditions, evaluate plan implementation effectiveness, and inform adaptive management. Required monitoring and evaluation is part of the proposed actions being consulted on.

Ecological Response Units

The actions in the current LMP are related to individual Ecological Response Units (ERUs) as defined in Table 1 (Terrestrial) and Table 2 (Aquatic).

Table 1. Terrestrial Ecological Response Units (ERUs) of the Santa Fe NF

Ecological Response Unit (ERU)	Abbreviation	System Type	Acres	Percent of Forest
Mixed conifer-frequent fire	(MCD)	Forest	429,967	25.6%
Ponderosa pine forest	(PPF)	Forest	403,915	24.0%
Spruce-fir forest	(SFF)	Forest	250,481	14.9%
Piñon-juniper woodland	(PJO)	Woodland	231,507	13.8%
Juniper grass	(JUG)	Woodland	97,469	5.8%
Piñon-juniper grass	(PJG)	Woodland	43,356	2.6%
Colorado Plateau Great Basin grassland	(CPGB)	Grassland	41,639	2.5%
Mixed conifer with aspen	(MCW)	Forest	40,174	2.4%
Sagebrush shrubland	(SAGE)	Shrubland	37,457	2.2%
Piñon-juniper sagebrush	(PJS)	Woodland	30,449	1.8%
Montane subalpine grassland	(MSG)	Grassland	17,707	1.1%
Alpine and tundra	(ALP)	Shrubland/ Mixed	5,015	0.3%
Bristlecone pine*	(BP)	Forest	2,784	0.1%
Gambel oak shrubland*	(GAMB)	Shrubland	1,716	<0.10%
Mixed-grass prairie*	(MGP)	Grassland	1,147	<0.1%
Shortgrass prairie*	(SGP)	Grassland	91	<0.1%
Total Acres			1,634,874	97.3%**

* These ERUs are not discussed in depth within this plan. Individually, they represent less than 1 percent each, and in total comprise less than 2 percent of forest acres, so are not priority targets of direct management efforts over the duration of the plan. Although alpine tundra also represents less than 1 percent of the forest, it was added to the plan based on expressed interest of forest users.

** Riparian (Aquatic) ERUs comprise the remaining 2.7% of the forest.

Table 2. Riparian Ecological Response Units of the Santa Fe NF

Symbol	ERU	Acres	Percent of Forest
HERB	Herbaceous	15,373	0.9%
CWG (cottonwood group)	Narrowleaf cottonwood/shrub	15,010	0.9%
CWG (cottonwood group)	Rio Grande cottonwood/shrub	7,493	0.5%
MCWG (mixed conifer/willow group)	Willow/thinleaf alder	6,957	0.4%
MCWG (mixed conifer/willow group)	Ponderosa pine/willow	665	<0.1%
MCWG (mixed conifer/willow group)	Upper montane conifer/willow	495	<0.1%
Totals		45,993	2.7%*

* Terrestrial ERUs comprise the remaining 97.3% of the forest.

Objectives of the Land Management Plan

The objectives that will be used to try and reach the desired conditions over the life of this plan are defined below.

All Vegetation Types

Objective 1: Over a 10-year period, complete at least the following treatments (Table 3) to move vegetation resources toward desired conditions:

Table 3. 10-year period of acres completed for Ecological Response Units by mechanical treatment and prescribed fire

Vegetation ERU	Mechanical Treatment (acres)	Prescribed Fire and Naturally Ignited Wildfire (acres)
Mixed Conifer with Frequent Fire (MCD)	10,000–80,000	50,000–200,000
Ponderosa Pine (PPF)	15,000–100,000	150,000–250,000

Objective 2: Over a 10-year period, complete 2,500 to 50,000 acres of combined vegetation treatments in highly departed non-forested ERUs* to move vegetation toward desired conditions (i.e., restoration). Treatments may include mechanical treatments, prescribed fire or naturally ignited wildfires, seeding, or other techniques still to be determined by best available science, depending on the specific ERU.

*Highly departed non-forested ERUs are juniper grass (JUG), piñon juniper grass (PJG), Colorado Plateau Great Basin grassland (CPGB), sagebrush shrubland (SAGE), and montane subalpine grassland (MSG).

Water

Objective 1: Maintain "properly functioning" and improve at least two "impaired" or "functioning at-risk" watersheds every 10 years using the objectives from Vegetation ERUs, Aquatic Species, Water Resources, and Riparian Management Zones and Wetland Ecosystems.

Objective 2: Over 10 years, improve watershed function by decommissioning or mitigating impacts (e.g., maintenance, improvements, reroutes) on at least 100 miles of routes (e.g., system roads, unauthorized routes, or trails) to the point of restoring hydrologic and ecological function.

Riparian and Wetland Ecosystems

Objective 1: Riparian ecosystems move toward desired conditions (less than a 33 percent departure from desired condition) for vegetation functional diversity, vegetation seral state, riparian corridor connectivity, and flood regime (frequency, duration, and magnitude) by implementing 15 miles of stream restoration every 10 years. Actions that could improve riparian areas would be site-specific, but could include several of the following: removing invasive plant species, stabilizing the stream channel, restoring hydrologic connectivity between stream channel and riparian area, planting native species, promoting natural revegetation of bare ground, redirecting other uses (e.g., providing other watering sources, closing areas to camping).

Aquatic Species and Habitats

Objective 1: Complete aquatic restoration on priority projects that restore 30 miles of aquatic habitat (e.g., increase pool quantity, provide stream cover, remove or install fish barriers, restore beaver populations, or treat invasive aquatic species) every 10 years to benefit aquatic species.

Objective 2: Every 10 years, restore native fish species to 20 miles of streams where nonnative fish are absent and where natural or human-made fish barriers exist.

Terrestrial Species and Habitats

Objective 1: Maintain, improve, or install at least one water feature per year to improve water availability for wildlife or livestock where natural water sources are limited. These water features can serve dual purposes for both wildlife and livestock and can be done in conjunction with objectives for water features in the range section.

Objective 2: Restore or enhance at least 50,000 acres of terrestrial wildlife habitat during each 10-year period of the life of the plan. This may be done in conjunction with objectives for treatments in the vegetation section.

Nonnative Invasive Species

Objective 1: Eradicate or suppress invasive plant species on at least 600 acres annually.

Forest Products

Objective 1: Provide at least 177,000 CCF (100 cubic feet) per decade to contribute to local forest product industry and for personal use, including 92,850 CCF (72,539 cords) per decade of fuelwood.

Sustainable Rangelands and Livestock Grazing

Objective 1: Annually remove, improve, or reconstruct at least 5 percent of the forest's range infrastructure that is no longer necessary or in poor or non-functional condition.

Objective 2: Maintain, improve, or install at least one water feature per year to improve water availability for wildlife or livestock where natural water sources are limited.

Developed Recreation

Objective 1: At two developed recreation sites, accomplish at least 75 percent of deferred maintenance projects every 3 years.

Dispersed Recreation

Objective 1: Maintain (clear, repair tread, brush, or improve drainage) at least 25 percent of system trails every 3 years.

Objective 2: Verify and correct proper signage and alignment of trails on the ground and with maps and geospatial data (i.e., cartographic accuracy) for at least 25 percent of system trails every 3 years.

Objective 3: Undertake sustainably designed capital improvements (e.g., alteration, expansion, or new construction) on at least 1 mile of poorly designed or maintained trail every 3 years. The mile may be contiguous or non-contiguous.

Wilderness Areas

Objective 1: Within the life of the plan, at least 10 miles of high-priority boundary line will be surveyed and posted.

Continental Divide National Scenic Trail

Objective 1: During the life of the plan, connect the remaining unconnected segments (5 miles on FS lands and approximately 7 miles within San Pedro Parks Wilderness) in the Cuba Ranger District.

Caja Del Rio Wildlife and Cultural Interpretive Management Area

Objective 1: Within 5 years of plan implementation, develop off-site interpretive materials (e.g., remote exhibits, brochures, or website information) for both:

- Portions of the National Historic Trails on the Caja del Rio to promote a sense of discovery for visitors.
- Opportunities to view and protect the unique flora and fauna in the area.

Cultural Interpretive Management Areas

Objective 1: Within 10 years, develop at least one on-site interpretive tool that provides interpretation and educational information about each site.

Objective 2: Within 8 years, complete and stabilize the entire trail on each site to provide for site protection and visitor safety.

Description of 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 is typically larger than the area directly affected by the action. In this context, the action area for this consultation will include the entire Forest.

The Santa Fe National Forest administers almost 1.6 million acres and is located in portions of seven counties—Rio Arriba, San Miguel, Sandoval, Santa Fe, Mora, Los Alamos, and only 0.2 acre in Taos County within the Pecos Wilderness (Figure 1). The Santa Fe NF is divided into five ranger districts: Coyote, Cuba, and Jemez span the Jemez Mountains and are west of the city of Santa Fe (referred to as the “west side”); Pecos-Las Vegas spans the Sangre de Cristo Mountains east of the city of Santa Fe (referred to as the “east side”); and Española runs down the middle and is located on both east and west sides. The Santa Fe NF shares borders with the Carson National Forest, Bandelier National Monument, Pecos National Historic Park, the Valles Caldera National Preserve, Los Alamos National Laboratories, land administered by the Bureau of Land Management, nine pueblos, one Tribal nation, and various land grants.

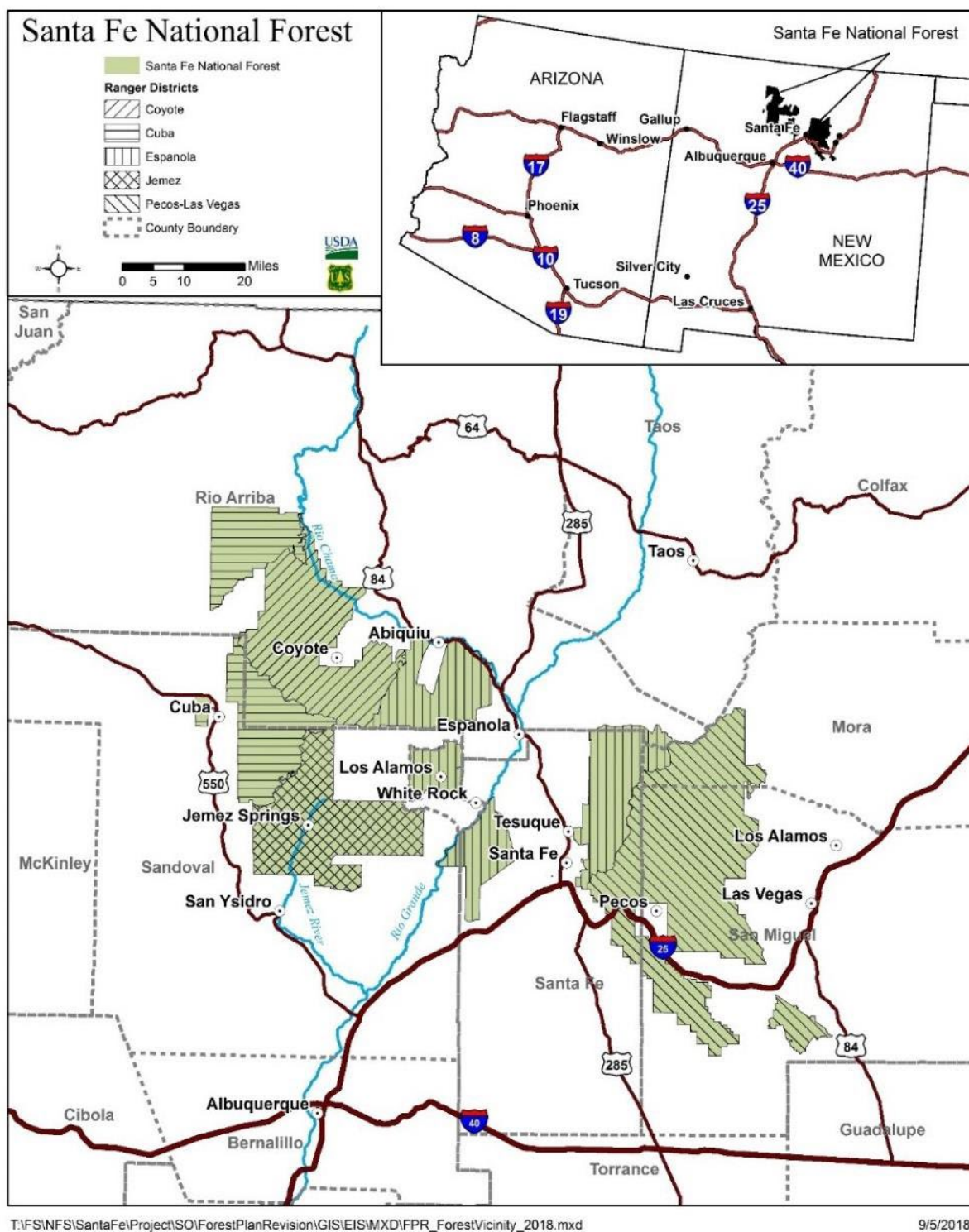


Figure 1. Vicinity of the Santa Fe NF showing county boundaries, major highways, and major rivers. The inset shows the location of the Santa Fe NF within New Mexico.

The forest stretches across mountains, valleys, and mesas that can be divided into two fairly distinctive sections: the west side centered on the Jemez Mountains and the east side in the Sangre de Cristo Mountains. Elevation varies from 5,000 to 13,000 feet, with the summit of Truchas Peak (13,108 feet) in the Pecos Wilderness being the highest point on the east side and Chicoma Mountain (11,561 feet) standing the highest on the west side. The majority (95 percent) of the forest lies within the Rio Grande watershed.

This land management plan (LMP) covers all the National Forest Service (NFS) lands within the Santa Fe NF boundary. The action area includes all lands under the jurisdiction of the Santa Fe NF and all adjacent lands that could be directly or indirectly affected by decisions or actions implemented under the direction of the proposed LMP.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components in our evaluation for each species: (1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the consequences of the proposed Federal action on the species that are reasonably certain to occur as a result of the proposed action; and, (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

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

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

Adverse Modification Determination

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: 1) the *Status of Designated Critical Habitat*, which evaluates the range-wide condition of designated critical habitat for the species in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the designated critical habitat overall; 2) the *Environmental Baseline*, which

evaluates the condition of the designated critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; 3) the *Effects of the Action*, which determines the consequences of the proposed Federal action on the PCEs that are reasonably certain to occur as a result of the proposed action and how they will influence the recovery role of affected designated critical habitat units; and, 4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs, and how they will influence the recovery role of affected designated critical habitat units.

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

STATUS OF SPECIES AND CRITICAL HABITAT

Mexican Spotted Owl

The Mexican spotted owl (owl) was listed as a threatened species on March 16, 1993 (USFWS 1993). 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 1995b). Mexican spotted owl critical habitat was designated on August 31, 2004 (USFWS 2004). The USFWS released the final Mexican spotted owl Recovery Plan, First Revision (Recovery Plan) in December 2012 (USFWS 2012).

Description and Life History

The Mexican spotted owl is a medium-sized owl without ear tufts. They are mottled with irregular white spots on its brown abdomen, back, and head. Mexican spotted owls nest in caves, in stick nest built by other birds, on debris platforms in trees, and in tree cavities. Mexican spotted owls have distinct annual breeding periods, with courtship beginning in March. Eggs are typically laid in late March or early April, with eggs hatching approximately 30 days later. Nestling owls generally fledge in early to mid-June, and will typically disperse from the nest area by late August or early September. 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 1995b), and in the revised Recovery Plan (USFWS 2012). The information provided in those documents is included herein by reference.

Distribution and Habitat Requirements

The spotted owl occurs in forested mountains and canyonlands throughout the southwestern United States and Mexico (Gutierrez 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 first revision of the Recovery Plan, the RUs were renamed as "Ecological Management Units" (EMUs) to be in accord with current USFWS guidelines. The Mexican spotted owl's range within the United States is divided 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). 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 revised Recovery Plan (USFWS 2012) lists 1,324 known owl sites in the United States. An owl site is an area used by a single owl or a pair of adult or subadult owls for nesting, roosting, or foraging. The increase in number of known owl sites is mainly a product of 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 in New Mexico, and Gila National Forest in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (USFWS 2012). However, we do assume that an increase in the number of areas considered occupied is a positive indicator regarding owl abundance.

Threats

Two primary reasons were cited for listing 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 impacts associated with stand-replacing fire were also cited as a looming threat at that time. Since publication of the original Recovery Plan (USFWS 1995b), 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 2012).

Mexican Spotted Owl Critical Habitat

The USFWS designated critical habitat for the owl in 2004 on approximately 8.6 million ac. (3.5 million ha.) 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 and restricted habitats in the 1995 Mexican Spotted Owl Recovery Plan (USFWS 1995b). Protected habitat is defined as Protected Activity Centers (PACs) and unoccupied slopes greater than 40 percent in the mixed conifer and pine-oak forest types that have not had timber harvest in the last 20 years, and all legally and administratively reserved lands (e.g., wilderness). Restricted habitat is defined as all other mixed conifer, pine-oak (except those pine-oak stands in the Southern Rocky Mountain Recovery Units and the Colorado Plateau Recovery Unit outside of New Mexico), and riparian forests not falling within PACs or slopes greater than 40 percent (USFWS 1995b). The 2012 Mexican Spotted Owl Recovery Plan, First Revision (USFWS 2012) describes unoccupied protected habitat and all restricted habitat as “Recovery Habitat,” no longer using the term restricted to describe foraging, dispersal, and future nest/roost habitat. The 2012 Recovery Plan also removes administratively reserved lands and steep slopes from automatic inclusion as protected areas.

The PCEs for owl critical habitat were determined from studies of their habitat requirements and information provided in the 1995 Recovery Plan (USFWS 1995b). Since owl habitat can include both canyon and forested areas (USFWS 2004; 2012), 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:

- PCE I:** 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. or 1.4 m. above ground) of 12 in. (30.5 cm.) or more;
- PCE II:** A shade canopy created by the tree branches covering 40 percent or more of the ground; and,
- PCE III:** Large, dead trees (snags) with a dbh of at least 12 in. (30.5 cm).
- PCE IV:** High volumes of fallen trees and other woody debris;
- PCE V:** A wide range of tree and plant species, including hardwoods; and,
- PCE VI:** Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

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

management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

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

PCE I: Presence of water (often providing cooler and often higher humidity than the surrounding areas);

PCE II: Clumps or stringers of mixed-conifer, pine-oak, piñon-juniper, and/or riparian vegetation;

PCE III: Canyon walls containing crevices, ledges, or caves; and,

PCE IV: High percent of ground litter and woody debris.

New Mexico Meadow Jumping Mouse

The New Mexico meadow jumping mouse (jumping mouse) was proposed as an endangered species with critical habitat on June 20, 2013 (78 FR 37363; 78 FR 37328). On June 10, 2014, the jumping mouse was listed as endangered (USFWS 2014a). Final designated critical habitat was published on March 16, 2016 (USFWS 2016). In addition to the summary information provided below, we completed a species status assessment report (SSA Report) for the jumping mouse in May 2014 and January 2020, which are hereby incorporated by reference (USFWS 2014b, USFWS 2020). A Recovery Outline was also completed concurrent with the final rule listing the species as endangered (USFWS 2014c). The SSA Reports provide a thorough assessment of jumping mouse biology and natural history and assesses demographic risks (such as small population sizes), threats, and limiting factors in the context of determining viability and risk of extinction for the species. In the SSA Reports, we also compiled biological data and a description of past, present, and likely future threats (causes and effects) facing the jumping mouse.

Description

The jumping mouse is a small mammal that measures approximately 7.4 to 10 inches (187 to 255 millimeters (mm)) in total length (Van Pelt 1993). The coloration is typically grayish-brown on the back, yellowish-brown on the sides, and white underneath. The species has large, five-toed hind feet, smaller front feet with four toes, a long tail, and the ability to make long leaps. The tail of the mouse is longer than its body (Miller 1911). Adult mice are known to make jumps of

up to three feet, but when they require speed, they reduce their jumps to approximately one foot (Hoffmeister 1986). The New Mexico meadow jumping mouse is semi-aquatic, and its large feet may assist it with swimming (Pers. Comm., Dr. J. Frey, 2007).

Life History

The jumping mouse is generally nocturnal, but occasionally diurnal. It is active only during the growing season of the grasses and forbs on which it depends. During the growing season, the jumping mouse accumulates fat reserves by consuming seeds. Preparation for hibernation (weight gain, nest building) seems to be triggered by day length. The jumping mouse hibernates about nine months out of the year (longer than most other mammals) and is only active three or four months during the summer (Morrison 1990, VanPelt 1993, Frey 2005). Within this short time frame, it must breed, birth, raise young, and store up sufficient fat reserves to survive the next year's hibernation period. In addition, the species only lives up to three years and has one litter annually with an average of five young. As a result, if resources are not available in a single season, populations are greatly stressed.

The jumping mouse is considered to be a k-selected species because it is long-lived for a rodent species, and few offspring are produced. Although this strategy is successful in environments that are stable and predictable, k-selected species are at a higher risk of extinction because they recover more slowly from reductions in population size and are subject to genetic and demographic stochasticity.

Habitat Requirements

The jumping mouse is a habitat specialist (Frey 2006). It nests in dry soils, but uses moist, streamside, dense riparian/wetland vegetation up to an elevation of about 8,000 feet (Frey 2006). The jumping mouse appears to only utilize two riparian community types: 1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canary grass alliances); and 2) scrub-shrub wetlands (i.e., riparian areas along perennial streams that are composed of willows and alders) (Frey 2005). It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edge of permanent water. Home ranges vary between 0.37 and 2.7 acres (0.15 and 1.1 hectares) and may overlap (Smith 1999).

Population Distribution and Status

The historical distribution of the jumping mouse likely included riparian wetlands along streams in the Sangre de Cristo and San Juan Mountains from southern Colorado to central New Mexico, including the Jemez and Sacramento Mountains and the Rio Grande Valley from Española to Bosque del Apache National Wildlife Refuge, and into parts of the White Mountains in eastern Arizona.

Based on historical (1980s and 1990s) and current (from 2005 to 2020) data, the distribution and abundance of the jumping mouse has declined significantly range-wide. The majority of extirpations have occurred since the late 1980s to early 1990s, as we found about 70 formerly occupied locations are now considered extirpated. Since 2005, there have been 77 documented

remaining populations (18 in Colorado, 22 in New Mexico, and 37 in Arizona) spread across the eight geographic management areas described in the final listing rule (USFWS 2020). Nearly all of the current populations are isolated and widely separated, and nearly all of the 77 populations located since 2005 have patches of suitable habitat that are too small to support resilient populations of jumping mice. In addition, at least 11 populations documented since 2005 have been substantially compromised since 2011 (due to water shortages, grazing, or wildfire and post-fire flooding), and these populations could already be extirpated (see USFWS 2014 for a detailed discussion).

Due to the life history (short active period, short life span, low fecundity, low dispersal ability) and because the jumping mouse requires such specific suitable habitat conditions, populations have a high potential for extirpation when habitat is altered, fragmented, or eliminated. We found that there has been a significant reduction in occupied localities likely due to cumulative habitat loss and fragmentation across the range of the jumping mouse. The past and current habitat loss has resulted in the extirpation of historical populations, reduced the size of existing populations, and isolated existing small populations. Ongoing and future habitat loss is expected to result in additional extirpations of more populations. The primary sources of past and future habitat losses are from grazing pressure (which removes the needed vegetation) and water management and use (which causes vegetation loss from mowing and drying of soils), lack of water due to drought (exacerbated by climate change), and wildfires (also exacerbated by climate change). Additional sources of habitat loss are likely to occur from scouring floods, loss of beaver ponds, highway reconstruction, residential and commercial development, coalbed methane development, and unregulated recreation.

New Mexico Jumping Mouse Critical Habitat

Critical habitat for the New Mexico meadow jumping mouse has been designated in New Mexico. In total, approximately 13,973 acres (5,657 hectares) along 272.4 kilometers (169.3 miles) of flowing streams, ditches, and canals has been designated as critical habitat in eight units within Colfax, Mora, Otero, Sandoval, and Socorro Counties in New Mexico; Las Animas, Archuleta, and La Plata Counties in Colorado; and Greenlee and Apache Counties in Arizona (USFWS 2016).

Primary constituent elements (now referred to as Physical or Biological Features (PBFs) per 81 FR 7414-7440) are defined as “The features that support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity” (50 CFR § 424.02).

Primary constituent elements (PCEs) for New Mexico meadow jumping mouse critical habitat (81 FR 14293) are as follows:

PCE I. Riparian communities along perennial or seasonally available water characterized by

one of two wetland vegetation community types:

- a. Persistent emergent herbaceous wetlands especially characterized by presence of primarily forbs and sedges (*Carex spp. or Schoenoplectus*) or
- b. Scrub-shrub riparian areas that are dominated by willows (*Salix spp.*) or alders (*Alnus spp.*); and

PCE II. Flowing water that provides saturated soils throughout the mouse's active season that supports tall (average stubble height of herbaceous vegetation of at least 69 cm (27 inches); and

PCE III. Sufficient areas of 9 to 24 km (5.6 to 15 miles) along a stream, ditch, or canal that contain suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice; and

PCE IV. Include adjacent floodplain and upland areas extending approximately 100 m (330 feet) outward from the water's edge (as defined by the bankfull stage of streams).

Jemez Mountains Salamander

The Jemez Mountains salamander (JMS) was listed as an endangered species on September 10, 2013 (USFWS 2013a), and its critical habitat was designated on November 20, 2013 (USFWS 2013b).

Description and Life History

The JMS is a slender and elongate salamander that is uniformly dark brown above, with occasional fine gold to brassy coloring, stippling dorsally (i.e., on the back and sides) and is sooty gray ventrally (i.e., underside). The JMS is a member of the family Plethodontidae. They lack both lungs and gills and breathe through the mucous membranes in their mouth and throat and through their moist skin. The JMS is strictly terrestrial, not using standing surface water for any life stage (USFWS 2010).

Jemez Mountains salamanders are found in relatively high humidity microhabitats and soils that contain deep igneous, subsurface rock that is fractured to allow retreat underground to below the frost line. Much of their life cycle occurs underground, with surface activity inside rotted coniferous logs or under rocks during a brief period of the summer when conditions are warm and wet, which is typically from July through September. Occasional JMS observations have been made in May, June, and October. Relatively warm and wet environmental conditions suitable for JMS aboveground activity, with cool and wet microhabitats, are likely influenced by snow infiltration and summer monsoon rains. Approximately 75 percent of their diet is comprised of ants; other prey items include beetles, mites, spiders, earthworms, and other small invertebrates. Range movements are poorly documented, but home ranges tend to be very small.

Habitat Requirements

This JMS is found primarily in coniferous habitats with abundant rocks and surface logs, especially on steep north-facing slopes. They typically occur between 7,200 and 9,500 ft (2,194 and 2,895 m), but have been found as low as 6,998 ft (2,130 m) and as high as 10,990 ft (3,350 m) (Ramotnik, 1988). Their habitat is typically mixed-conifer forest with greater than 50 percent canopy cover consisting mainly of Douglas-fir, blue spruce (*Picea pungens*), Engelmann spruce (*Picea engelmannii*), white fir, limber pine (*Pinus flexilis*), quaking aspen (*Populus tremuloides*), and Ponderosa pine. The species has occasionally been found in stands of pure Ponderosa pine and in spruce-fir and aspen stands, but these forest types have not been adequately surveyed. The ground surface in forest areas supporting JMS typically have: (a) moderate to high volumes of large fallen trees and other woody debris, especially coniferous logs at least 10 inches (in) (25 centimeters [cm]) in diameter, particularly Douglas-fir, which are in contact with the soil in varying stages of decay from freshly fallen to nearly fully decomposed, or (b) structural features, such as rocks, bark, and moss mats that provide the species with food and cover. Underground habitat in forest or meadow areas supporting JMS will contain interstitial spaces provided by: (a) igneous rock with fractures or loose rocky soils, (b) rotted tree root channels, or (c) burrows of rodents or large invertebrates (Degenhardt et al. 1996; USFWS 2012).

Threats

Current threats include wildfire, logging, habitat loss (e.g., road construction and development), and chytridiomycosis fungal (*Batrachochytrium dendrobatidis*) infection (USFWS 2012b). Additional threats affecting the JMS and its associated habitat include alterations to habitat of varying magnitude from fire suppression, forest composition and structure conversions, post-fire rehabilitation, forest and fire management, roads, trails, habitat fragmentation, and recreation. Some of these threats may be exacerbated by the current and projected effects of climate change. Additional information on the JMS' natural history and status can be obtained from the final listing rule (USFWS 2013a).

Jemez Mountains Salamander Critical Habitat

The JMS final critical habitat rule designated approximately 90,716 ac (36,711 ha) as critical habitat in two units in the Jemez Mountains, New Mexico (USFWS 2013b). Unit 1 consists of 42,445 ac (17,177 ha) in Rio Arriba and Sandoval Counties, New Mexico, in the western portion of the Jemez Mountains (USFWS 2013b). In this critical habitat unit, 41,466 ac (16,781 ha) is federally managed, with 26,531 ac (10,736 ha) on Forest Service lands and 14,935 ac (6,044 ha) on VCNP/USNPS lands, 73 ac (30 ha) on New Mexico Department of Game and Fish lands, and 906 ac (367 ha) on private lands. Unit 2 consists of 48,271 ac (19,535 ha) in Los Alamos and Sandoval Counties, New Mexico, in the eastern, southern, and southeastern portions of the Jemez Mountains.

The PCEs for JMS designated critical habitat consist of four components:

PCE I: Moderate to high tree canopy cover, typically 50 to 100 percent canopy closure, that provides shade and maintains moisture and high relative humidity at the ground surface, and:

- A. Consists of the following tree species alone or in any combination: Douglas fir (*Pseudotsuga menziesii*); blue spruce (*Picea pungens*); Engelmann spruce (*Picea engelmannii*); white fir (*Abies concolor*); limber pine (*Pinus flexilis*); Ponderosa pine (*Pinus ponderosa*); and aspen (*Populus tremuloides*); and,
- B. Has an understory that predominantly comprises: Rocky Mountain maple (*Acer glabrum*); New Mexico locust (*Robinia neomexicana*); oceanspray (*Holodiscus spp.*); or shrubby oaks (*Quercus spp.*).

PCE II: Elevations from 6,988 to 11,254 ft (2,130 to 3,430 m).

PCE III: Ground surface in forest areas with:

- A. Moderate to high volumes of large fallen trees and other woody debris, especially coniferous logs at least 10 in (25 cm) in diameter, particularly Douglas fir, which are in contact with the soil in varying stages of decay from freshly fallen to nearly fully decomposed; or,
- B. Structural features, such as rocks, bark, and moss mats that provide the species with food and cover.

PCE IV: Underground habitat in forest or meadow areas containing interstitial spaces provided by:

- A. Igneous rock with fractures or loose rocky soils;
- B. Rotted tree root channels; or,
- C. Burrows of rodents or large invertebrates.

Holy Ghost Ipomopsis

The Holy Ghost ipomopsis (HGI) was listed as an endangered species on March 23, 1994 (59 FR 13836). A recovery plan for the HGI was developed in 2002 (USFWS 2002) and amended recovery criteria were established in 2019 (USFWS 2019). Although the criteria outlined in the Recovery Plan amendment have not been fully implemented, biologists are taking action to conserve the current population, establish new populations, and reach recovery goals.

Biology and Habitat

The Holy Ghost ipomopsis is an endemic plant found in the Holy Ghost Canyon in the Santa Fe National Forest in north-central New Mexico. The 2-mile long canyon road-cut accompanying Forest Road 122 is the only naturally occurring population of the Holy Ghost ipomopsis. Holy Ghost ipomopsis conservation is a collaborative effort between the U.S. Fish and Wildlife Service, U.S. Forest Service, New Mexico Energy, Minerals, and Natural Resources Department - Forestry Division, University of New Mexico, and Albuquerque BioPark Botanical Garden. Biologists are working to establish additional stable populations of the Holy Ghost ipomopsis in the Santa Fe National Forest (Roth 2019; USFWS 2008). The Recovery Summary Report (Roth 2019) contains the most current species information.

Since 2005, the greenhouse rearing of Holy Ghost ipomopsis seedlings and rosettes has been successful (86% - 89% success rate) (Roth 2019). Seed collection and greenhouse propagation is essential for establishing new populations in geographically different drainages, a central Recovery Plan objective (USFWS 2002). Within the natural population at Holy Ghost Canyon, there has been annual variation in the number of plants over the past 17 years. While this trend is likely due to fluctuating environmental conditions, the cause of population increases and declines is not entirely understood. However, it is most likely due to water availability in the canyon (Roth 2019).

In addition to the natural site, the Holy Ghost ipomopsis exists at three transplanted sites (Windsor, Indian Creek, and Panchuela) in the Santa Fe National Forest. Populations were initially healthy with hundreds of individual plants, but maintaining both consistent and increasing populations has been difficult. In 2019, the Indian Creek site had 286 individuals, Windsor had approximately 30 individuals, and Panchuela had 23 individuals (Roth 2019).

A study on habitat disturbance conducted from 2012-2019 revealed that more individual plants survive in thinned forest plots. These results suggest that some disturbance might aid Holy Ghost ipomopsis transplant, survival, and population establishment (Roth 2019).

Reasons for Listing

The USFWS listed the Holy Ghost ipomopsis as a federally endangered species due to its extremely limited distribution, heavy recreational use in the single canyon where the plant is found, inadequate protection by existing regulations, and management activities such as exclusion of fire and timber harvest.

Threats

Fire Management and Fire Suppression

Fire creates a mosaic landscape and opens the forest canopy allowing light to reach the forest floor, serving an important role in habitat management for the Holy Ghost ipomopsis. Because of heavy recreational use, forest management has suppressed fire in Holy Ghost Canyon for over 80 years (USFWS 2008). This disruption of ecological processes poses a threat to the Holy Ghost ipomopsis, potentially disrupting important, dynamic habitat processes needed this plant.

Anthropogenic Impacts

Holy Ghost Canyon is a popular recreation destination. The Holy Ghost ipomopsis is endemic to this canyon and tends to grow along the roadside. Therefore, vehicles and recreation use within the canyon poses a risk to this species. People may collect the flowers or trample the plants, limiting the individual plant's ability to flower and produce seed. Since the Holy Ghost ipomopsis is a relatively short-lived plant (2-5 years), long-term heavy recreational use may have devastating effects to the entire population (USFWS 2008). Additionally, potential habitat for the Holy Ghost ipomopsis is also susceptible to natural resource extraction and subsequent

activities. While these activities must be approved, the ecological disruption creates a risk for the Holy Ghost ipomopsis (USFWS 2008).

Climate Change

The Intergovernmental Panel for Climate Change (IPCC) predicts hotter temperatures and more erratic precipitation patterns for the southwestern United States (Christensen et al. 2013). The Holy Ghost ipomopsis is sensitive to drought and its limited habitat might become unsuitable under future climate change scenarios (USFWS 2002).

ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the ESA, when considering the effects of the action on federally listed species, the USFWS is required to take into consideration the environmental baseline. Regulations implementing the ESA (50 FR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in progress. The environmental baseline defines the status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (84 FR 44976-45018).

Terrestrial

The Santa Fe NF contains a broad range of ecosystems divided across gradients of moisture and elevation, including grasslands, shrublands, woodlands, forests, and alpine tundra. Plant and animal species depend on these ecosystems to sustain life and diversity, especially within the aquatic and riparian systems (discussed in a separate section) that contain some of the most threatened ecosystems in the arid Southwest. The Santa Fe NF manages more high-elevation vegetation types (spruce-fir forests, mixed conifer forests, montane grasslands, ponderosa pine forests, and sub-alpine grasslands) than other major landowners in the Southwest, with elevations ranging from 5,300 feet to 13,103 feet at the summit of Truchas Peak in the Pecos Wilderness. The Forest contains the largest proportion of mixed conifer forests (32 percent) across the Southwestern Region. These exceptional areas of ecological and biological distinction allow for significant opportunities to manage and conserve these vegetation systems in ways that promote biodiversity and resiliency into the future. The primary goal of this forest plan with respect to vegetation, is to manage the forest for ecological integrity and sustainability, while providing for the social and economic needs of human communities that depend on the forest. Twelve upland vegetation types (Ecological Response Units or ERUs) (Table 1) exist in large enough quantities on the Forest to have specific plan components (Appendix A).

Aquatic

There are six main riparian ERUs in the Santa Fe NF: herbaceous, narrowleaf cottonwood/shrub, Rio Grande cottonwood/shrub, willow/thinleaf alder, ponderosa pine/willow, and upper montane conifer/willow (Table 2). Inclusive within these ERUs, or as isolated features on the landscape outside of the ERUs, occur discrete bodies of water such as wetlands, seeps, springs, ponds, lakes and reservoirs, and their associated vegetation composition and structure. Riparian ERUs collectively occupy about three percent of the Santa Fe NF landscape.

Status of the New Mexico Meadow Jumping Mouse within the Action Area

Within the proposed action area of Santa Fe NF in the Jemez Mountains Geographic Management Area, jumping mice are found in isolated locations along the Rio Cebolla and San Antonio Creek. In 2005 and 2006, the New Mexico meadow jumping mouse was captured at 5 localities within the Jemez Mountains in northern New Mexico, Sandoval County (Frey 2005a). A study conducted by Carol Chambers from 2016-2019 also detected 97 New Mexico meadow jumping mice along multiple reaches of the Rio Cebolla and the Rio de Las Vacas (Chambers 2019).

Status of NMMJM Critical Habitat within the Action Area

There are three critical habitat subunits comprising the overall geographic management area for the New Mexico meadow jumping mouse on the Santa Fe NF. All of these sites are within the final critical habitat.

1. San Antonio Creek Subunit: This subunit begins along the northern part of San Antonio Creek where it exits the boundary of the Valles Caldera National Preserve and follows the creek about 11.5 km (7.1 mi) through mostly Forest Service lands where it meets private land immediately downstream of the San Antonio Campground. The stream segment surrounding the 2005 capture location (Frey 2005a) is considered occupied; however, it is unknown whether the jumping mouse persists throughout the upstream segment of San Antonio Creek. Because there has only been one population of the jumping mouse found since 2005 in the San Antonio Creek drainage with limited suitable habitat of 0.39 ha (0.96 ac) and it was dry in 2012 and 2013 (USFWS 2012a & 2013e), additional populations are needed to provide connectivity and expand jumping mouse populations.

2. Rio Cebolla Subunit: This subunit extends from an old beaver dam about 0.6 km (0.4 mi) north of Hay Canyon downstream about 20.7 km (12.9 mi) where it meets the Rio de las Vacas. The stream segments surrounding the 2005 and 2006 capture locations (Frey 2005a & 2007b) are considered occupied; however, it is unknown whether the jumping mouse persists throughout the other segments of the Rio Cebolla. Because there have only been six populations of the jumping mouse found since 2005, additional populations are needed to provide connectivity and expand jumping mouse populations throughout the drainage into areas that were historically occupied (Morrison 1985 & 1992, Frey 2005a). Therefore 20.7 km (12.9 mi) in the subunit were included,

which would augment the current size and connectivity of suitable habitat to increase the distribution of the jumping mouse in the Jemez Mountains and provide population redundancy and resiliency. The Rio Cebolla in 2012 and 2013, this area did not appear to be currently suitable. Cattle had entered the enclosure where fencing was down and heavy grazing eliminated much of the herbaceous vegetation, leaving mostly bare, dry soils (USFWS 2012a, and 2013e).

3. Rio del las Vacas Subunit: This subunit starts about 0.8 km (0.5 mi) north of Forest Road 94 adjacent to Burned Canyon and extends from about 23.3 km (14.5 mi) downstream to the confluence with the Rio Cebolla Subunit. Although much of the habitat was historically occupied with individuals detected as recently as 1989 (Morrison 1985 & 1992, Frey 2005a), no jumping mice were captured during surveys in 2005 (Frey 2005a). This subunit would provide connectivity to the Rio Cebolla and allow for possible expansion of jumping mice from that currently occupied subunit, which is contiguous with the Rio de las Vacas Subunit, into historically occupied habitat along the Rio de las Vacas drainage.

Status of the Mexican Spotted Owl within the Action Area

Protected Activity Centers (PAC) on the Santa Fe NF contain about 41,383 acres. The Mexican spotted owl is known to occur on the Coyote, Jemez, Española, and Pecos-Las Vegas Ranger Districts. This species is apparently non-migratory and feeds primarily on small mammals. Young owls, however, are known to disperse long distances. A recent record documents the movement of a Mexican spotted owl that was banded on the Gila NF and then found dead on the Carson NF (RMRS 2013), which could mean it might have travelled through the Santa Fe NF.

Status of Owl Critical Habitat within the Action Area

Critical habitat units on the Santa Fe NF contain about 198,888 acres. The Mexican spotted owl requires a variety of mixed conifer habitats, proximity to riparian areas, standing large snags for roosting and nesting, or cavities in vertical canyon walls. Timber management activities negatively affected habitat before the Mexican spotted owl was listed as threatened in 1995. Timber harvest, prescribed burning, and other management activities are designed following the 2012 Mexican Spotted Owl Recovery Plan (USFWS 2012) along with consultation with the USFWS. These management activities can still have disturbance affects to the Mexican spotted owl and its habitat.

Status of the Jemez Mountain Salamander within the Action Area

Based on collection data dating back to 1952, there are over 650 known observations of JMS within the Jemez mountains. Some of these observations fall within the boundary of the Valles Caldera, but the majority of salamanders have been discovered on slopes and drainages within the Santa Fe NF. Data limitations, comprehensive survey costs, and the likelihood of natural, annual, and spatial variations make determining overall species population trends difficult. Current ecological conditions in the proposed action area, particularly for wildfire, are highly departed from reference conditions.

Status of Salamander Critical Habitat within the Action Area

There are 56,897 acres of designated critical habitat on the Santa Fe NF. The Service broke the critical habitat into two units with both having areas located in the action area (Santa Fe NF):

Unit 1 consists of 42,445 acres in Rio Arriba and Sandoval Counties, New Mexico, in the western portion of the Jemez Mountains. In Unit 1, 41,466 acres are federally managed, with 26,531 acres on Santa Fe NF lands and 14,935 acres on Valles Caldera National Preserve lands; 73 acres are New Mexico Department of Game and Fish lands; and 906 acres are private lands. This unit is located in the western portion of the distribution of the Jemez Mountains salamander and includes Redondo Peak, which is on the Valles Caldera National Preserve.

Unit 2 consists of 48,271 acres in Los Alamos and Sandoval Counties, New Mexico, in the eastern, southern, and southeastern portions of the Jemez Mountains. In Unit 2, 46,375 acres are federally managed, with 30,366 acres on Santa Fe NF lands, 8,811 acres on Valles Caldera National Preserve lands, and 7,198 acres on National Park Service lands (Bandelier National Monument). The remaining 1,897 acres in Unit 2 are on private lands.

Threats include habitat loss from severe wildfire and the current presence of chytrid fungus. Wildlife can carry the fungus but did not do so in the past as chytrid fungus was not known to be present under reference conditions.

Status of the Holy Ghost Ipomopsis within the Action Area

The only known naturally occurring population of Holy Ghost ipomopsis is limited to Holy Ghost Canyon in the Santa Fe National Forest. In addition, there are currently five experimental out-planting locations within four drainages on Santa Fe National Forest lands: Holy Ghost Canyon, Winsor Creek, Panchuela Creek, and Indian Creek drainages.

Ongoing monitoring has continued for this species since 2003 and is summarized in the Final Recovery Plan Amendment for Holy Ghost Ipomopsis (USFWS 2019) as: “From 2003-2008, an average of 703 total plants were counted per year. From 2008-2012, an average number of 484 total plants were counted per year, indicating a downward population trend. From 2013-2017, an average of 593 total plants were counted per year (Roth 2015a). While numbers since 2012 appear to be increasing, the population remains below the average number of plants used for the most recent 5-year review (n=703) (USFWS 2008). There is evidence that the species is in a declining trend. The comparison of population wide census results from 2008 and 2015 seem to point at an increase in overall population size. However, the 2015 survey effort was longer, the spring was much wetter and about half of the plants were counted from plantings for the 2 Holy Ghost Canyon Treatment plots in 2011. These factors make it uncertain whether a true change was seen between the survey years and make comparison between the two census efforts difficult (Roth 2018).

EFFECTS OF THE ACTION

Effects of the action refer to the consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (84 FR 44976-45018). The USFS 2020 BA includes effects or impacts on species or critical habitat; effects or impacts will be referred to as consequences in this opinion.

Because this is a programmatic consultation and many site-specific actions have not yet been planned, we will only discuss consequences in terms of the general effects we anticipate will occur to each species and its critical habitat. In general, the opinion will discuss the relevant plan components and the most likely effects associated with them from the BA. The LMP components provide direction to protect, limit, or mitigate effects on species or critical habitat. All individual plan components including objectives, standards, and guidelines can be found in the Forest's LMP (USFS 2021) and individual plan components with potential adverse effects to listed species can be found in Appendix A. Because the Forest's BA (USFS 2020) and LMP (USFS 2021) do not authorize site-specific actions, nor do they typically prescribe the timing or exact location of specific land management activities, a more detailed effects discussion will occur as each site-specific project is developed, and these projects will be consulted on separately, as required. Specifically, each site-specific project or activity implemented under the revised LMP that may affect a listed species or critical habitat will undergo a separate ESA section 7(a)(2) consultation.

Effects Analysis for New Mexico meadow jumping mouse

Effects from relevant program areas to the NMMJM are discussed below.

Effects of Vegetation Management and Fire and Fuels

Management Common to All Vegetation Types

Under the proposed action, eight ERUs (CPGB, JUG, MCD, MSG, PPF, PJG, SAGE and RIP) are likely to improve the quality of habitat for all wildlife. This is achieved through objectives, standards, and guidelines that combine the use of prescribed fire and mechanical treatments (Table 4). Grassland (montane subalpine grasslands and Colorado Plateau/Great Basin grasslands), woodland (juniper grass, piñon-juniper grasslands, piñon-juniper sagebrush), and shrubland (sagebrush shrublands) ERUs have significantly less grass cover and productivity as a result of the exclusion of wildfire as well as legacy (historical) livestock grazing, and roads. This lack of cover contributes to reduced water infiltration, accelerated erosion, and declining soil productivity, especially during periods of drought, and contributes to a cycle that continues to reduce vegetative cover.

Table 4. Objectives are for a 10-year period and include acre ranges specified for mechanical treatments and fire by forested and non-forested vegetation types

Vegetation ERU	Mechanical Treatment (acres)	Prescribed Fire and Naturally Ignited Wildfire (acres)
Mixed conifer with frequent fire (MCD)	10,000-80,000	50,000-200,000
Ponderosa pine (PPF)	15,000-100,000	150,000-250,000
Non-forested*	2,500-50,000	3,800-50,000

* Juniper grass (JUG), piñon-juniper grass (PJG), Colorado Plateau Great Basin grassland (CPGB), and sagebrush shrubland (SAGE)

Although the fire regime condition class does not change for the ponderosa pine, wet mixed conifer, and spruce-fir ERU, each has a trend toward improvement. These ERU improvements have the potential to reduce the likelihood of wildfire entering riparian habitat and could result in reduced runoff from fires that do occur, provided treatments encompass NMMJM habitat.

Mechanical treatments and prescribed fire have the potential to result in short term impacts to NMMJM habitat (e.g., loss of floodplain or immediate upland area vegetation), especially if followed by an unpredicted heavy rainfall event. Plan guidelines and standards specific to the use of water placement, heavy equipment for forest management and wildfire prevention also has the potential of short-term impacts to NMMJM habitat.

Mechanical treatments and/or prescribed fire could, over the long term, help reduce uncharacteristic wildfire and the associated risk of substantial or complete loss of riparian and floodplain habitat although activities associated with it and suppression of wildfires could also result in short term impacts to suitable or restorable riparian habitat. Fire events may affect jumping mouse populations by killing individuals and perhaps modifying riparian and adjacent upland habitat on which they depend, the effects to vegetation are often temporary (72 FR 63015, November 7, 2007). Alternatively, fire can result in the loss of dense riparian herbaceous vegetation and result in a shift in the vegetation community to one that is drier and dominated by cattail and bulrush, which is not suitable for the jumping mouse (Frey and Kopp 2013, USFWS 2013c). Removal of overstory vegetation in areas utilized for hibernation can expose emerging NMMJM to predation. While guidelines could limit impacts, not all negative impacts are reduced or eliminated.

Effects of Watershed and Soil Management

There are 17 relevant desired conditions (ALL FW-WATER-DC, FW-SOIL-DC 1 and 2, ALL FW-RWE-DC, ALL FW-AQUASH-DC)(Appendix A) that guide management and activities within these plan areas. Desired conditions for water resources directs management to move

toward or maintain satisfactory watershed conditions including soil conditions which could contribute to improved riparian habitat. Desired conditions, if reached, would help provide habitat that is capable of providing for self-sustaining riparian species populations like NMMJM. This would include floodplains and adjacent upland areas used by nesting or hibernating NMMJM. Desired conditions would help ensure that water is available and not diminished for the needs of riparian species such as NMMJM. Streambanks, floodplains, and adjacent upland areas would have diverse habitat components needed by NMMJM for hibernation. Desired conditions provide vegetation supporting NMMJM consisting mostly of natives and which is free from invasive plants.

This program area could improve overall watershed and riparian conditions and could help limit impacts to riparian/wetland areas providing suitable or restorable NMMJM habitat. While standards and guidelines (Appendix A) could help limit impacts from restoration and other activities (e.g., planting vegetation), not all short-term negative impacts would be reduced or eliminated.

Effects of Sustainable Rangelands

There are seven relevant desired conditions (FW-RANGE-DC and FW-RWE-DC 2)(Appendix A) that guide management and activities here that address NMMJM's need for tall, vigorous herbaceous riparian vegetation (cool and warm season growing species), including the need for seedheads. Where annual fluctuations and seasonality of forage production are considered management activities must retain sufficient ground cover to help reduce the ability of overland flow to carry sediment and organic matter into suitable or restorable riparian habitat for the NMMJM.

The more sustainable action maintains or improves the riparian habitats and will also reduce unnecessary stressors caused by external influences (human disturbance). Changes in natural hydrologic disturbance regimes and patterns of sediment transport include alteration of the timing of downstream flow, attenuation of peak flows, and other effects. Such alterations can result from grazing in riparian management zones, dam construction, from diversions, or by water removal from rivers for irrigation or other consumptive uses, often in combination. The increased restoration through the proposed actions will also improve upland characteristics and reduce the potential for catastrophic fire. While standards and guidelines could limit impacts, not all negative impacts from rangeland management would be reduced or eliminated.

Effects of Infrastructures, Roads and Trails

Relevant desired conditions that guide management and activities include Facilities, Roads, Recreation (Dispersed and Developed), and special uses. Desired conditions direct that the location and design of roads do not impede wildlife and fish movement which would help address habitat connectivity and NMMJM movement and population expansion through riparian corridors.

This program area, primarily through the presence and maintenance of roads, recreation, and motorized trails can damage soil and vegetation within riparian, floodplain, and adjacent areas

that could serve as suitable or restorable NMMJM habitat. Consideration of methods that would discourage dispersed camping near cultural sites, sensitive habitat for at-risk species, interpretive sites, and water resources will be used. It could also improve some riparian areas where NMMJM may be present by removing degrading factors like roads, although there would be the potential for long term and short-term impacts from restoration activities. While standards and guidelines could limit road related impacts, not all negative impacts would be reduced or eliminated.

Effects of Wildlife, Fish, and Plants

There are three relevant desired conditions (All FW-TERRASH-DC)(Appendix A) that guide management and activities here. Desired conditions direct that management and activities provide for habitat configuration and availability to allow for adjustments in movements in response to climate and to provide for genetic diversity, especially important for this disjunct species.

While standards, design criteria, and guidelines could limit introduction of nonnative species, certain management activities utilized to provide for habitat configuration and availability to allow for adjustments in movements in response to climate and to provide for genetic diversity would not mitigate all negative impacts.

At-Risk Species

At-risk species include both aquatic and terrestrial species whose persistence is known to be at-risk. Their identification allows us to better address their ecological needs in the plan. At-risk species consist of (1) federally recognized threatened, endangered, proposed, and candidate species, and (2) species of conservation concern. At-risk species are found within all the Forest's ERUs. Although some plant, invertebrate, and aquatic species may be found in only one specific ERU, most terrestrial at-risk species use multiple ERUs to complete their basic life-cycle needs. Foraging needs and breeding behaviors of at-risk species often require animals to travel considerable distances spanning multiple ERUs.

This program area could reduce impacts to NMMJM, although surveys for NMMJM and habitat assessments could result in short term impacts from vegetation trampling. Habitat enhancement projects such as riparian fencing to protect habitat could also have short term vegetation and soil impacts in adjacent uplands (e.g., vehicles delivering/laying out materials). Frey and Malaney (2009) suggest that maintenance of suitable riparian habitat and long-term viability of jumping mouse populations might only be possible through creation of refugia by complete exclusion of livestock from the riparian zone.

Given the vulnerability of the isolated populations (77 documented populations since 2005), more information is needed to conclude that short term disturbance in the riparian zone and adjacent habitat would have minimal impact to NMMJM. While guidelines could limit restoration and other activity impacts and require project or activity mitigations or modifications, not all negative impacts would be reduced or eliminated.

Effects of Energy, Minerals, and Caves

In January 2018, there were 209 oil and gas leases covering approximately 89,000 acres in the Santa Fe NF, with 50 producing oil and natural gas wells on these leases. All of these leases and wells are within the San Juan Basin portion of the Santa Fe NF and were addressed in the Oil and Gas Leasing Environmental Impact Statement (EIS), which included forest plan amendments that established stipulations on new oil and gas leases, completed in 2008, and supplemented in 2012.

Relevant desired condition that guides management and activities include Lease Minerals. Minerals desired conditions directs that energy, mineral, and mining activities meet the legal mandates to facilitate the development of minerals in a manner that minimizes adverse impacts to surface and groundwater resources, watershed and forest ecosystem health, wildlife and wildlife habitat scenic character, and other desired conditions applicable to the area.

This program area has the potential through land or facility development or activities to impact NMMJM, often through disturbance and loss/fragmentation of habitat. Effects from the activities of this program are similar to the effects of roads. Access roads and the accompanying vehicle traffic and use of heavy equipment are often associated with mineral activities. In addition, surface occupancy causes direct habitat loss and the addition of human occupation increases the chances for harassment and lethal encounters.

This program area, primarily through the presence and maintenance of roads, recreation, and motorized trails can damage soil and vegetation within riparian, floodplain, and adjacent areas that could serve as suitable or restorable NMMJM habitat. It could also improve some riparian areas where NMMJM may be present by removing degrading factors like roads, although there would be short-term impacts from restoration activities. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.

Effects of Management Areas, Designated Areas, and Geographic Areas

Guidelines to decrease the footprint of ground disturbing activities can be found in multiple plan components throughout a variety of resources including Riparian Management Zones, At-risk Species, Soils, Forestry, Roads, Special Uses, and Minerals. Common verbiage includes, “footprints of ground-disturbing activities should be as small as possible or located where ground disturbance has previously occurred.” Under the proposed action, temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects should be closed, decommissioned, or obliterated (restored to more natural vegetative conditions) upon project completion to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use. There are also objectives to mitigate ecological damage at developed recreation sites every three years.

Because NMMJM utilize adjacent upland habitats for dispersal, day nesting, maternal nesting, and hibernating, recreational activities such as camping, fishing, and off-road vehicle use pose a concern to the jumping mouse. NMMJM require adequate herbaceous riparian vegetation to support foraging, breeding, and hibernating individuals. Fragmentation and habitat loss

contribute to population isolation. While standards and guidelines could limit related impacts, not all negative impacts would be reduced or eliminated.

Effects on NMMJM Critical Habitat and Primary Constituent Elements

Effects to occupied, suitable, recoverable or dispersal habitat discussed above would apply to designated critical habitat for this species.

PCE I: Riparian communities characterized by emergent herbaceous wetland vegetation

All program areas are likely to have some impact on riparian/wetland vegetation within critical habitat given that riparian areas are where most types of forest recreational activities occur. Developed recreation use is especially heavy within the San Antonio Creek recreation area within the critical habitat subunit.

PCE II: Flowing water, saturated soils, dense vegetation

While special uses for water diversion or groundwater pumping are not known to be impacting flow in critical habitat, there is potential that increased development of private land may create more demand for special uses for water conveyances (e.g., spring developments, pipelines) from NFS to private land. Livestock grazing is likely impacting some areas that may be suitable or restorable NMMJM habitat.

PCE III: Sufficient space

Not all segments of critical habitat provide a minimum of 5.6 miles in length of suitable habitat but may contain restorable habitat. Objectives to enhance or restore riparian areas may or may not occur within critical habitat. Where they do, there would be short term negative impacts from equipment or people such as vegetation trampling and streambank disturbance.

PCE IV: Floodplain and upland areas

While standards and guidelines limit impacts in floodplains and upland areas, not all acreage within approximately 100 m (330 ft. outward of the water's bankfull edge) within critical habitat and not all impacting activities (e.g., grazing, roads, developed campsites) are precluded here. Therefore, some sustained negative effects (e.g., vegetation trampling) are expected for the life of the plan.

Overall, essentially all program areas are likely to have some negative impacts to NMMJM primary constituent elements of critical habitat. However, LMP implementation would not necessarily have these impacts across all critical habitat for the NMMJM on the Santa Fe NF.

Cumulative Effects and Climate Change Analysis for NMMJM

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur within the action area of impacts for a listed species. State activities to date have included survey for presence or absence of NMMJM. New Mexico Department of

Game and Fish (NMDGF) fish stocking program draws people to some NMMJM sites and proposed critical habitat. During hunting and fishing seasons NMMJM habitat may be impacted. This impact can include trampling of forage/cover vegetation, noise, harassment of individual mice or crushing of nests. Within the Jemez Mountains Conservation Area, recreation in San Antonio Creek and Rio Cebolla streams systems established campgrounds and dispersed camping has the potential to damage habitat. Road maintenance adjacent to Lower Rio Cebolla, FR 379 could reduce habitat availability and could cause sedimentation to reach the stream system. Private land activities include some business and home sites with associated structures as well livestock grazing with facilities. Private land grazing is typically heavy, and some is year-round.

The implications of climate change and variability for NMMJM with greater extremes of temperature and moisture could reduce water quantity and habitat quantity over time. With potential for higher intensity of storms, there could also be the possibility that flood impacts along streams may occur at more frequent intervals and at greater intensities resulting in continued threats to NMMJM and habitat.

Effects Analysis for Mexican Spotted Owl

Effects from relevant program areas to the MSO are discussed below.

Effects of Vegetation Management and Fire and Fuels

Management Common to All Vegetation Types

Desired conditions (ALL FW-VEG-DC, FW-WUI-DC 2 and 3, FW-FIRE-DC 2 and 3)(Appendix A) direct management toward activities and conditions where fire is again able to play its historic role in maintaining fire adapted ecosystems; this would reduce the threat of stand-replacing or uncharacteristic wildfire to MSO and habitat.

Desired conditions (ALL FW-MCW-DC, FW-MCD-DC, FW-PPF-DC)(Appendix A) within the proposed action explicitly define the percentage of seral states in each forested ERU (i.e., early, mid-, and late-). They also provide guidance on tree size class, vegetation structure, fire return interval, dominant understory vegetative species types, as well as specific ecological conditions indicative of a healthy ecosystem. The proposed action sets a maximum objective within two ERUs (MCD and PPF) of 280,000 to 350,000 acres of restoration work to be completed respectively, over a 10-year period. The desired conditions in the proposed action calls for 72 percent of MCD to be open canopy. The objectives, standards, and guidelines in the proposed action would reduce this risk of catastrophic fire by moving toward desired conditions which call for 86 percent of PPF to be open canopy. This would improve seral state and reduce the likelihood that uncharacteristic fire would negatively impact the MSO.

Treatments within the upland ERUs will benefit MSO in the long-term, but will have short-term effects to foraging habitat, change in stand structure which may impact nesting, and noise during treatment operations would cause disturbances to any individuals in the area. Site specific treatments will be designed to meet the objectives and measures in the 2012 Recovery Plan. The

use of wildland fire provides for desired ERU conditions including maintaining species needed by wildlife. After a landscape-scale fire, it also provides reestablishment of native plants needed by wildlife and their prey. Most, but not all, firewood cutting occurs in the fall after the MSO breeding season; however, in general, desirable firewood/fuelwood or firewood species utilized by MSO are Douglas fir and Gambel oak-which could potentially impact MSO habitat to some extent.

Prescribed fire and mechanical treatments could, over the long term, reduce uncharacteristic wildfire and the associated risk of substantial or complete loss of areas providing MSO PAC and Recovery habitat. However, activities associated with burning (equipment, personnel, smoke) could also result in short term impacts such as disturbance to nesting MSO, smoke settling into PACs, and temporary loss of herbaceous vegetation needed by their prey. Fires, whether prescribed or naturally ignited, can also destroy snags and downed woody debris (Randall-Parker and Miller 2002), thereby degrading habitat conditions for MSO prey species in the short term. Stand replacing wildfire kills trees used for nesting and roosting which can alter the habitat to such a degree that it is no longer suitable for MSO. They become more vulnerable to predators due to lack of cover, and are less likely to reproduce successfully if nesting and prey habitat have been degraded.

The impact of fire suppression activities on habitat quality can, in some cases, exceed that of the fire itself (Backer et al. 2004). Backfires may burn some MSO habitat. Low-flying aircraft dropping water or retardant may result in disturbance or injury. Bulldozer lines compact the soil and may cause erosion, which in turn can affect the quality of MSO nesting and foraging habitat. Dozer lines can easily become avenues for recreational vehicle access, and hand lines can result in hiker and mountain bike disturbance to nesting owls. Invasive or noxious weed species transported on the wheels of heavy equipment can affect the foraging success and abundance of prey species. While guidelines could help limit these impacts, not all negative impacts would be reduced or eliminated.

Effects of Watershed and Soil Management

There are four relevant desired conditions (FW-RWE-DC)(Appendix A) that guide management and activities here. Desired conditions would provide for structurally diverse, dense, and large tree conditions to support riparian dependent species and would protect against the risk of diminished water that supports MSO recovery habitat. Desired conditions, guidelines, and standards would help protect soil, and hence vegetation density, cover, and height (seedheads) conditions in riparian recovery habitat needed by MSO prey.

This program area has the potential to improve overall soil and vegetation conditions within selected watersheds through restoration projects (e.g., increase herbaceous ground cover with thinning, recontour incised channels, plantings of willows and grasses). However, there would also be the potential for short term implementation impacts (e.g., disturbance where these restoration efforts occur within MSO habitat). While guidelines could limit impacts from restoration and other activities, not all short-term negative impacts would be reduced or eliminated.

Effects of Infrastructures, Roads, and Trails

There are no desired conditions that guide management and activities in this program area relevant for the MSO. Disturbance from these programs has the potential to disturb nesting and roosting birds or cause the nest to be abandoned.

This program area could disturb nesting or roosting MSO during road and trail maintenance activities like brush removal/mowing, tree removal, grading or public use for recreation activities. Habitat fragmentation can occur if new trails or roads are constructed adjacent or in a PAC or in critical habitat. It could also improve some areas where MSO may be present, although there would also be short term impacts to remove unauthorized roads or trails. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.

Effects of Wildlife, Fish, and Plants

There are six relevant desired conditions (FW-TERRASH-DC 1-3, FW-ATRISK-DC 1-3) (Appendix A) that guide management and activities here. Desired conditions direct management toward the recovery of MSO and its habitat and address the threat to MSO from noise and disturbance.

This program area could reduce impacts to MSO and its habitat, although monitoring or habitat assessments could result in short term disturbance impacts to MSO and possibly some limited trampling of prey habitat. While guidelines could limit project or activity impacts, not all negative impacts would be reduced or eliminated.

Effects of Designated Areas, Management Areas, and Geographic Areas

Ponderosa pine and piñon-juniper forest restoration and meadow protection is needed throughout the geographic area (GA). The thinning of dense, small-diameter trees and shrubs in combination with prescribed burning, will support long-range restoration efforts and reinstate natural fire regimes. Restoration will result in decreased woody encroachment of meadows, restored and preserved grasslands, improved watershed health, and greater wildlife diversity.

Traditional cultural uses by surrounding communities for hunting, grazing cattle, piñon harvesting, and fuelwood gathering is the leading human use of the North Jemez Mountains GA. Small local communities that dot the landscape between forestland boundaries, and occupy inholdings throughout this GA, have depended on forest access and products for centuries and continue to rely on the GA to sustain local livelihoods and culture.

The West Sangres and Caja GA is a popular recreation destination for locals and tourists, which has resulted in increased pressure on developed campsites and trails. Recreation requires new strategies to improve high-use and developed recreation while decreasing user conflicts. In addition, overly dense forests in this GA increase the risk of uncharacteristic, stand-replacing wildfire in the extensive wildland-urban interface along the border of the city of Santa Fe and the Santa Fe Municipal watershed, requiring forest restoration such as thinning and prescribed burning of dense, small-diameter vegetation.

This program area could impact MSO through disturbance during breeding season and impacts to habitat, especially where there may be concentrated gatherings of people and their animals. Recreation activities such as OHV use, rock climbing, geo-caching, or camping have contributed noise and disturbance in MSO habitat. Effects are variable depending on time of day/night, intensity, frequency, and distance to MSO. Some developed recreation sites are within MSO habitat and some are adjacent to PACs; however, these sites have been in place for decades. Persistent noises are likely more disruptive than infrequent disturbances, and intensity of disturbance is proportional to noise level. Trampling, and vegetation removal can reduce forage for prey species. There could be some habitat improvement where campsites are rehabilitated but recreation at these sites could still impact MSO. While standards and guidelines could help limit impacts, not all negative impacts would be reduced or eliminated.

Oil and Gas Leasing Area

This program area could impact MSO habitat with mineral extraction through noise disturbance, special use facilities (e.g., powerlines), or energy exploration and associated activities, although impacts are generally more localized and limited. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.

Effects on Owl Critical Habitat and Primary Constituent Elements

Effects to occupied, suitable, recoverable or dispersal habitat discussed above would apply to critical habitat for this species.

Forest PCEs:

PCE I-III: Forest structure

All program areas are likely to impact regeneration of woody species and herbaceous plant prey habitat. Most are likely to impact forest canopy cover and snag persistence through burning or thinning to some level. While individual projects may have short-term negative effects, the better long-term forest health is expected to be beneficial for the owl.

PCE IV-VI: Adequate prey species

Some program areas (e.g., thinning, burning) are likely to impact the amount of down woody material while others are likely to influence the density and vigor of herbaceous vegetation through foot, hoof, or equipment action, which is expected to temporarily reduce available prey species for the owl.

Canyon PCEs:

Some program areas are likely to impact the tree density that supports the cool microclimate needed to sustain MSO in canyon habitat; these are also likely to impact ground litter and woody debris. The reduction in ground litter and debris will temporarily reduce foraging opportunities for the owl for individual project activities.

Overall, most program areas are likely to have some negative impacts to MSO primary constituent elements of critical habitat. However, LMP implementation would not necessarily have these impacts across all critical habitat for the MSO on the Santa Fe NF.

Cumulative Effects and Climate Change Analysis for the Owl

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur within the action area of impacts for a listed species. Timber harvest, prescribed burning activities, and livestock grazing occur on the adjacent nonfederal lands. The PACs adjacent to or within about 300 feet of adjacent to private land may be subject to disturbance associated with residential, business, livestock grazing, and other activities.

The implications for MSO of climate change and variability with greater extremes of temperature and moisture could include declining acreage of forested habitat, greater risk of insect and disease impacts to habitat, and greater risk of stand-replacing wildfire.

Effects Analysis for Jemez Mountain Salamander

Effects from relevant program areas to the JMS are discussed below.

Effects of Frequent Fires and Grass Cover

Desired conditions (ALL FW-PPF-DCs, ALL FW-MCD-DCS) within the proposed action explicitly defines the percentage of seral states in each forested ERU (i.e., early, mid-, and late-). They also provide guidance on tree size class, vegetation structure, fire return interval, dominant understory vegetative species types, as well as specific ecological conditions indicative of a healthy ecosystem. The proposed action sets a maximum objective within two ERUs (MCD and PPF) of 280,000 to 350,000 acres of restoration work to be completed respectively, over a 10-year period. The desired conditions in the proposed action calls for 72 percent of MCD to be open canopy. The objectives, standards, and guidelines in the proposed action would reduce this risk of catastrophic fire by moving toward desired conditions which call for 86 percent of PPF to be open canopy. This would improve seral state and reduce the likelihood that uncharacteristic fire would negatively impact the JMS.

Coarse woody debris levels would also trend toward desired conditions after 50 years, providing organic matter inputs into the soil and creating habitat for species like the Jemez Mountains salamander. The proposed action provides desired conditions that define specific coarse woody debris (CWD) conditions within each forested ERU. This includes specific measures of tons per acre. The proposed action sets a maximum objective of 87,000 acres for restoration work to be completed over a 10-year period within the non-forested ERUs. There are also timber objectives that promote the collection of fuel wood. Both of these objectives would decrease CWD departure and positively affect ecological conditions required by some at-risk species.

Prescribed fire and mechanical treatments could, over the long term, reduce uncharacteristic wildfire and the associated risk of substantial or complete loss of areas providing JMS protected and recovery habitat. However, activities associated with burning (equipment, personnel) could

also result in short term impacts such as disturbance to JMS and temporary loss of herbaceous vegetation needed for cover. While guidelines could help limit these impacts, not all negative impacts would be reduced or eliminated.

Effects of Watershed and Soil Management

The Outlet San Antonio Creek sub-watershed (14,800 total acres) is largely managed by the Santa Fe NF (91 percent). There are over 39 miles of streams and over 1,400 acres of riparian vegetation within the sub-watershed. It is potential habitat for the Rio Grande cutthroat trout and is critical habitat to the Mexican spotted owl, the northern goshawk, the Jemez Mountains salamander, and the New Mexico meadow jumping mouse. Impaired watershed condition framework (WCF) metrics for this watershed are aquatic biota, riparian vegetation, water quality, roads and trails (both density and maintenance), soil condition, and fire condition.

Ground-disturbing management activities standards and guidelines should minimize short- and long-term adverse impacts to soil resources which would reduce effects to JMS protected and recovery habitat. However, activities associated with forest management that has the potential to cause soil movement (equipment, personnel) could also result in short term impacts such as disturbance to JMS. While guidelines could help limit these impacts, not all negative impacts would be reduced or eliminated.

Effects of Infrastructures, Roads, and Trails

Relevant desired conditions that guide management and activities include Facilities, Roads, Recreation (Dispersed and Developed), and special uses. Desired conditions direct that the location and design of roads do not impede wildlife and fish movement which would help address habitat connectivity and JMS movement and population expansion through riparian corridors.

This program area could damage needed soil and vegetation and disturb JMS, primarily related to the presence and maintenance of motorized roads and trails. It could also improve some areas where JMS may be present, although there could also be short term impacts with removal of unauthorized roads or trails. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.

Effects of Wildlife, Fish, and Plants

There are five relevant desired conditions (FW-TERRASH-DC- 1 and 2, All FW-ATRISK-DC) (Appendix A) that guide management and activities here. Desired conditions direct management toward the recovery of JMS and its habitat and address the threat to JMS from noise and disturbance, and provide habitat components for JMS and their prey (e.g., mistletoe and logs).

This program area could reduce impacts to JMS and its habitat, although monitoring or habitat assessments could result in short term disturbance impacts to JMS and possibly some limited trampling of prey habitat. At-risk species that are not exposed to unnatural disease spread or are treated for known pathogens will have increase survival over exposed or untreated. While

guidelines could limit project or activity impacts, not all negative impacts would be reduced or eliminated.

Effects of Energy, Minerals, and Caves

This program area has the potential through land or facility development or activities to impact JMS, often through disturbance and loss/fragmentation of habitat. Effects from the activities of this program are similar to the effects of roads. Access roads and the accompanying vehicle traffic and use of heavy equipment are often associated with mineral activities. In addition, surface occupancy causes direct habitat loss and the addition of human occupation increases the chances for harassment and lethal encounters. While guidelines could limit project or activity impacts, not all negative impacts would be reduced or eliminated.

Effects of Designated Areas, Management Areas, and Geographic Areas

The Jemez Mesas and Canyons Geographic Area predominantly contains ERUs MCD (38 percent) and PPF (35percent) ecosystems. The designated areas: Monument Canyon Research Natural Area and the Dome Wilderness lie within the geographic area's boundary, while Bandelier National Monument and the Valles Caldera National Preserve are located nearby. The Jemez River, a tributary of the Rio Grande, also flows through this area. The forests here are home to threatened and endangered species including the JMS. This geographic area has desired conditions for healthy and productive ecosystems, and for protecting water quality and availability.

Guidelines to decrease the footprint of ground disturbing activities can be found in multiple plan components throughout a variety of resources including Riparian Management Zones, At-risk Species, Soils, Forestry, Roads, Special Uses, and Minerals. Common verbiage includes, "footprints of ground-disturbing activities should be as small as possible or located where ground disturbance has previously occurred." Under the proposed action, temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects should be closed, decommissioned, or obliterated (restored to more natural vegetative conditions) upon project completion to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use. There are also objectives to mitigate ecological damage at developed recreation sites every three years. However, actions associated with these protection measures may have short term impacts to JMS and its habitat.

Effects on Salamander Critical Habitat and Primary Constituent Elements

Effects to JMS recovery and protected habitat discussed above would apply to critical habitat for this species. It is important to note that LMP implementation would not necessarily have these impacts across all critical habitat for the JMS on the Santa Fe NF.

PCE I: Forest Structure

All program areas are likely to impact regeneration of woody species and herbaceous plant prey habitat. Most are likely to impact forest canopy cover through burning or thinning to some level.

While the short-term effects will be negative, the long-term effects are expected to result in increased forest health and resiliency.

PCE III: Ground Surface in Forested Areas

Some program areas are likely to impact the tree density that supports the cool microclimate needed to sustain in forested areas; these are also likely to impact ground litter and woody debris, which will decrease cover and habitat for the salamander temporarily.

PCE IV: Underground Habitat in Forest or Meadow

Potential for limited, negative, short-term impacts such as trampling of prey habitat during monitoring or habitat assessments are expected from project activities.

Overall, essentially all program areas are likely to have some negative impacts to JMS primary constituent elements of critical habitat.

Cumulative Effects and Climate Change Analysis for the Salamander

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur within the action area of impacts for a listed species. Timber harvest, prescribed burning activities, and livestock grazing occur on the adjacent nonfederal lands. The implications for JMS of climate change and variability with greater extremes of temperature and moisture could include declining acreage of forested habitat, greater risk of insect and disease impacts to habitat, and greater risk of stand-replacing wildfire.

Effects Analysis for Holy Ghost Ipomopsis

Effects from relevant program areas to the Holy Ghost ipomopsis are discussed below.

Effects of Frequent Fires and Grass Cover

There are 12 relevant desired conditions (ALL FW-VEG-DC, FW-WUI-DC 2 and 3, FW-FIRE-DC 2 and 3) (Appendix A) that guide management and activities here. Desired conditions direct management toward activities and conditions where fire is again able to play its historic role in maintaining fire adapted ecosystems; this would reduce the threat of stand-replacing or uncharacteristic wildfire to Holy Ghost ipomopsis and habitat.

Desired conditions within the proposed action explicitly defines the percentage of seral states in each forested ERU (i.e., early, mid-, and late-)(ALL FW-PPF-DCs, ALL FW-MCD-DCS). They also provide guidance on tree size class, vegetation structure, fire return interval, dominant understory vegetative species types, as well as specific ecological conditions indicative of a healthy ecosystem. The proposed action sets a maximum objective within two ERUs (MCD and PPF) of 280,000 to 350,000 acres of restoration work to be completed respectively, over a 10-year period. The desired conditions in the proposed action calls for 72 percent of MCD to be open canopy. The objectives, standards, and guidelines in the proposed action would reduce this risk of catastrophic fire by moving toward desired conditions which call for 86 percent of PPF to

be open canopy. This would improve seral state and reduce the likelihood that uncharacteristic fire would negatively impact on Holy Ghost ipomopsis. Additionally, Holy Ghost ipomopsis is an early seral species, so creating earlier seral habitat would be good for the species. Desired conditions within the proposed action also address fire and its effects on Holy Ghost ipomopsis habitat within the general forest and the Wildland Urban Interface.

Treatments to return Holy Ghost ipomopsis habitat back to reference condition will beneficially affect the species on the whole. The guidelines provide for management to frequent fire forest communities with short term impacts to habitat while providing an overall benefit to the habitat types that Holy Ghost ipomopsis resides in. The occupied habitat in Holy Ghost Canyon and the associated outplanting sites continues is subject to canopy encroachment and provides little of the early seral habitat needed by the species.

Numerous factors within the five-mile buffer of the proposed Holy Ghost Canyon management area make long term restoration of the fire regime in the area difficult. Approximately 31 percent of the area is wilderness, 24 percent is inventoried roadless area, and 10 percent is private property. Thinning within occupied habitat would likely need to be more restrictive than the current guidelines. Hand thinning within the immediate vicinity of occupied habitat could have the least short-term impacts while providing long term benefits. A small disturbance plot to track survival rates of transplanted plants in thinned and unthinned plots has proven inconclusive.

The Tres Lagunas fire burned to the edge of occupied habitat in 2013 (Roth 2018) and burned approximately 13 percent of the five-mile buffer of the proposed Holy Ghost Canyon management area. None of the plants or their habitat in Holy Ghost Canyon or Indian Creek were impacted by the fire, firefighting activities, or post-fire clean-up (Roth 2018). In 2016, suitable habitat was surveyed in areas that were burned by the Tres Lagunas fire with special emphasis on roadcuts with the appropriate limestone substrate, but no new populations were found. Approximately 16 percent of the five-mile buffer of the proposed Holy Ghost Canyon management area is Wildland Urban Interface (WUI). The Holy Ghost WUI covers most of the occupied suitable habitat for Holy Ghost ipomopsis. Implementation of fuels treatments within these WUI's (Holy Ghost, Pecos Canyon Corridor, Windsor Canyon, Grass Mountain, Power Line and Hyde Park Corridor) would increase the resiliency of Holy Ghost ipomopsis and its habitat to the effects of fire. While guidelines could help limit the impacts from this program area, not all negative impacts would be reduced or eliminated.

Effects of Watershed and Soil Management

The Holy Ghost ipomopsis most often grows on steep, west-facing limestone slopes with plants concentrated along a roadside. Standards and guidelines for managing soil and watershed are relevant to management of the species habitat. Riparian management zone standards would help reduce the spread of invasive species, resulting in less competition for space and resources with these species. Riparian management zone guidelines would maintain overall riparian health. Soil guidelines would reduce the risk of introduction of nonnative invasive species and maintain soil. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.

Effects of Infrastructures, Roads, and Trails

The desired condition for roads helps maintain healthy watercourses. Holy Ghost ipomopsis is situated between Holy Ghost and Doctor creeks. Avoiding affecting these watercourses maintains the overall habitat health for Holy Ghost ipomopsis.

Holy Ghost ipomopsis is still largely confined to steep open roadsides along Santa Fe NF Road 122. The desired conditions and guidelines for roads reduce the impacts associated with these activities, but the species remains vulnerable to impacts from road use, road management, road improvement, and road maintenance. Impacts from these activities could include being ran over, being destroyed during road maintenance, ditch cleanout, or road widening. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.

Effects of Wildlife, Fish, and Plants

The desired conditions, objectives, and management approaches that guide management for terrestrial species and habitat provide for improvement of Holy Ghost ipomopsis habitat. The desired conditions and management approach for at-risk species direct management toward the recovery of Holy Ghost ipomopsis.

The guidelines for the Wildlife, Fish and Plants program area can reduce some impacts to Holy Ghost ipomopsis. The activities from this program are unlikely to have impacts that are high enough in magnitude, intensity, and duration to have negative impacts with the exception of restoration or enhancement of terrestrial wildlife habitat. Activities and guidelines in this program area that are likely to benefit include those for nonnative invasive species removal. Smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*) are spreading within occupied habitat, resulting in the sod bound areas that exclude Holy Ghost ipomopsis (USFWS 2008). While guidelines could limit project or activity impacts, not all negative impacts would be reduced or eliminated.

Effects of Energy, Minerals, and Caves

Utility line maintenance remains one of the threats to Holy Ghost ipomopsis since these activities can result in direct disturbance to individual plants. The Holy Ghost ipomopsis occurs in an area with high mineral potential. The former Tererro mine is near the occupied habitat for the species, and there is recent interest in new mineral exploration south of the occupied habitat in the Jones Hill area. Within the five-mile buffer of the proposed Holy Ghost Canyon management area approximately 11 percent is listed as having high known mineral potential. Nearly all of the occupied site from the natural population has high known mineral potential. Mineral extraction within occupied habitat can result in the loss of individual plants and alteration of habitat to the point of no longer being suitable. Design criteria and standard could limit some impacts, but not all negative impacts would be reduced or eliminated.

Effects of Designated Areas, Management Areas, and Geographic Areas

Design criteria for this program area would guide the Forest to reduce impacts from oil and gas activities for a population of Holy Ghost ipomopsis heading toward recovery.

The guideline would reduce the impacts of fire suppression to Holy Ghost ipomopsis. Some impacts would be limited, but not all negative impacts would be reduced or eliminated.

Cumulative Effects and Climate Change Analysis for the Ipomopsis

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur within the action area of impacts for a listed species. Timber harvest, prescribed burning activities, livestock grazing, road management, utility corridor maintenance, and dispersed recreation occur on the adjacent nonfederal lands.

The implications for Holy Ghost ipomopsis of climate change and variability with greater extremes of temperature and moisture could include declining acreage of forested habitat, greater risk of insect and disease impacts to habitat, and greater risk of stand-replacing wildfire. Roth (2018) also indicated that low reproductive rates in well-established transplanted plants might be due to drought conditions.

CONCLUSION

Mexican spotted owl and designated critical habitat

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

1. Implementation of the management direction within the revised LMP will allow the Forest to manage for owl recovery and implement the owl's 2012 Recovery Plan (USFWS 2012).
2. The LMP components (desired conditions, objectives, standards, and guidelines) recognize the need to reduce the potential for landscape level, stand-replacing fire in ponderosa pine and mixed conifer forests that the owl occupies. Implementation of these components will improve forest condition and sustainability, and reduce the risk of high severity fire and the loss of owl habitat.
3. While some short-term adverse effects or consequences may occur as part of implementing the management direction within the revised LMP, the components will help to minimize them and over the long-term, forest health and resiliency are expected to improve, benefitting the owl.

New Mexico Meadow Jumping Mouse and designated critical habitat

After reviewing the current status of the New Mexico meadow jumping mouse and its designated critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that implementation of the Forest's revised LMP will not jeopardize the continued existence of the mouse and will not destroy or adversely modify its critical habitat. We base our conclusion on the following:

1. Watershed Resources improvement projects are anticipated to maintain or improve the ecological condition of riparian habitat during the 10- to 15-year life of the LMP. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve these habitats in the long-term.
2. Removing and thinning conifer encroachment will help restore desired vegetation species composition and structure in Riparian Management Zones, returning riparian areas toward desired conditions and contributing to more natural hydrologic cycles and functions.
3. Plan components will reduce the risk of population and habitat loss due to high severity fires.
4. While some short-term adverse effects or consequences may occur as part of implementing the management direction within the revised LMP, the components will help to minimize them and over the long-term, forest health and resiliency are expected to improve, benefitting the mouse.

Jemez Mountain Salamander and designated critical habitat

After reviewing the current status of the Jemez Mountain salamander and its designated critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that implementation of the Forest's revised LMP will not jeopardize the continued existence of the salamander and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:

1. Prescribed fire and mechanical treatments, over the long term, reduce uncharacteristic wildfire and the associated risk of substantial or complete loss of areas providing JMS protected habitat.
2. While some short-term adverse effects or consequences may occur as part of implementing the management direction within the revised LMP, the components will help to minimize them and over the long-term, forest health and resiliency are expected to improve, benefitting the salamander.

Holy Ghost Ipomopsis

1. Management zone standards would help reduce the spread of invasive species, resulting in less competition for space and resources with these species.
2. Prescribed fire and mechanical treatments over the long term, would reduce the chance of high-severity uncharacteristic wildfires and the associated risk of substantial or complete loss of the endemic species limited habitat.
3. While some short-term adverse effects or consequences may occur as part of implementing the management direction within the revised LMP, the components will help to minimize them and over the long-term, forest health and resiliency are expected to improve, benefitting the Holy Ghost ipomopsis.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA 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 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 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.

Programmatic Consultations

The proposed action described above is a “framework programmatic action” as defined in 50 CFR 402.02. In accordance with 50 CFR 402.14(i)(6), an incidental take statement is not required at the programmatic level for a framework that does not authorize future actions; incidental take resulting from any action subsequently authorized, funded, or carried out under the program will be addressed in subsequent section 7 consultation, as appropriate. Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species, such as the Holy Ghost ipomopsis. This biological opinion provides a broad-scale examination of the proposed action’s potential impacts on Mexican spotted owl, Jemez Mountains salamander, New Mexico meadow jumping mouse, and Holy Ghost ipomopsis, but we lack reasonable certainty of where, when, and how much incidental take may occur for the vertebrate species. Therefore, we have not quantified the amount and extent of incidental take that may result from the proposed action and have not exempted such take in this biological opinion for those species.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. The term “conservation recommendations” has been defined as USFWS suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility. In order for the USFWS to be kept informed of activities that either minimize or avoid adverse effects or that benefit listed species or their habitats, the USFWS requests notification of the implementation of the conservation recommendations. These recommendations include:

Mexican Spotted Owl

1. We recommend the Forest continue to work with USFWS to implement actions to protect PACs from high-severity fire and improve the resiliency of fire-adapted forested habitats.
2. We recommend the Forest continue to work with the USFWS to conduct owl surveys over the next several years to attempt to determine how owls modify their territories in response to fuels treatments, forest restoration, and wildland fire. This information will aid in understanding the short- and long-term impacts of these actions on the owl, and their subsequent effect on the status of the species.
3. We recommend the Forest continue to work with the USFWS to design forest restoration treatments across the Forest that protect existing nest/roost replacement habitat from high severity, stand-replacing fire and enhance existing or potential habitat to aid in sustaining owl habitat across the landscape. Owl 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 replacement recovery habitat.

New Mexico Meadow Jumping Mouse

1. We recommend the Forest continue to conduct surveys to confirm presence of NMMJM populations.
2. We recommend the Forest work with USFWS, NMDGF, and other partners to develop and improve riparian habitat during the 10- to 15-year life of the LMP.

Jemez Mountain Salamander

1. We recommend that the USFS complete salamander surveys in adjacent areas that have not been previously surveyed but contain critical habitat or suitable habitat outside of critical habitat.
2. We recommend that the USFS should continue to work with the USFWS in annual coordination efforts for salamander.

Holy Ghost Ipomopsis

1. The Forest should explore and continue to pursue control of invasive and/or non-native plants that compete with or inhibit the establishment of the Holy Ghost ipomopsis.
2. The USFWS encourages the Forest Service to use non-herbicide treatments that target the removal of invasive and/or non-native plants in, and around, Holy Ghost ipomopsis populations until the national herbicide application environmental assessment is completed.
3. The Forest should continue extensive monitoring of Holy Ghost ipomopsis occurrences range wide, with particular emphasis on population monitoring and demography studies in Holy Ghost Canyon as well as determining occupancy in canyons outside of Holy Ghost Canyon.

Disposition of Dead of 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 the New Mexico Ecological Services Field Office (see contact information on Biological Opinion cover letter). 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 on the effects of the U.S. Forest Service's Santa Fe National Forest Land Management Plan Revision. 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 maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded (applicable to future tiered consultations); (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 that was 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 consultation with the USFWS.

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Appendix A

U.S. Forest Service Santa Fe National Forest Land Management Plan Components specifically referenced from Biological Assessment (USFS 2020) and referred in U.S. Fish and Wildlife Service Biological Opinion Consultation #02ENNM00-2019-F-1123.

Acronym	Description	Acronym	Description
AIR	Air	NRT	National Recreation Trails
ALLDA	Designated Areas	OGLEASE	Oil and Gas Leasing Area
ALP	Alpine and Tundra	PARTNER	Partnerships
AQUASH	Aquatic Species and Habitats	PECOSRIV	Pecos River Canyon
ARCH	Cultural Resources and Archeology	PJS	Piñon Juniper Sagebrush
ATRISK	At-Risk Species	PJO	Piñon Juniper Woodland
CANBON	Cañada Bonita Proposed Research Natural Area	PPF	Ponderosa Pine Forest
CANNAC	Canadas and Nacimiento	RANGE	Sustainable Rangelands and Livestock Grazing
CAJA	Caja Del Rio Wildlife and Cultural Interpretive Area	REALTY	Lands Realty and Access
CAVES	Caves	REC	Recreation
CDNST	Continental Divide National Scenic Trail	RECSU	Recreation Special Uses
CPGB	Colorado Plateau and Great Basin Grassland	RECWILD	Recommended Wilderness Area
CULTINT	Cultural Interpretive Management Area	RENEWEREGY	Renewable Energy
DEVREC	Developed Recreation	RMAC	Rowe Mesa and Anton Chico
DISREC	Dispersed Recreation	RNA	Research Natural Areas
ELIGWSR	Eligible Wild and Scenic Rivers	ROADS	Roads
ESAN	East Sangres	RURALH	Rural Historic Communities
FAC	Facilities	RWE	Riparian and Wetland Ecosystems
FIRE	Fire and Fuels	SAGE	Sagebrush Shrubland
FORESTRY	Forest Products	SB	Scenic Byways
INVASIVES	Nonnative Invasive Species	SIGCAVES	Significant Caves
IRA	Inventoried Roadless Areas	SCENIC	Scenic Resources
JEMMC	Jemez Mesas and Canyons	SFF	Spruce Fir Forest
JNRA	Jemez National Recreation Area	SOIL	Soil Resources
JUG	Juniper Grasslands	TERRASH	Terrestrial Species and Habitats
LANDS	Land Status	TRIBES	Federally Recognized Tribes
LANDSU	Land Special Uses	VEG	Vegetation
LEASEMIN	Leasable Energy Minerals	WATER	Water Resources
MCD	Mixed Conifer with Frequent Fire	WHT	Wild Horse Territories
MCW	Mixed Conifer with Aspen	WILD	Wilderness Areas

Acronym	Description	Acronym	Description
MINERAL	Minerals	WSANCAJA	West Sangres and Caja
MSG	Montane Subalpine Grassland	WSR	Wild and Scenic Rivers
NHT	National Historic Trails	WUI	Wildland-Urban Interface
NJEMM	North Jemez Mountains	XBOUND	Cross Boundary Management

Component Code	Plan Component
FW-VEG-DC 1	<p>Ecosystems maintain all of their essential components (e.g., plant density, species composition, structure, coarse woody debris, and snags), processes (e.g., disturbance and regeneration), and functions (e.g., nutrient cycling, water infiltration, and carbon sequestration).</p> <p>a Ecosystems contain a mosaic of diverse native plants (e.g., composition and genetic diversity) with vegetative structural diversity that encourages vigor, connectivity and persistence at a variety of scales across the landscape, reflecting their natural disturbance regimes.</p> <p>b Native plant communities dominate the landscape, while invasive species are nonexistent or low in abundance and do not disrupt ecological functioning.</p> <p>c Natural ecological cycles (e.g., hydrologic, energy, and nutrient) facilitate the shifting of plant communities, structure, and ages over time due to natural ecological processes affecting site conditions (e.g., fire and climate fluctuations).</p> <p>d Vegetation structural diversity and forest floor fuel loadings support native insect and disease populations within their range of natural variability.</p> <p>e Vegetative cover and litter are distributed across the soil surface in adequate amounts to limit erosion and contribute to soil deposition and development. Soil cover and herbaceous vegetation protect soil, facilitate moisture infiltration, and contribute to plant and animal diversity and ecosystem function.</p> <p>f Seral state proportions (per the ‘Seral State Proportions for the Southwestern Region’ supplement) are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.</p> <p>g At the scale of the plan unit, overall plant composition similarity to site potential (FSH 2090.11) averages greater than 66 percent, but can vary considerably at the mid- and fine- scales owing to a diversity of seral conditions.</p>

Component Code	Plan Component
FW-VEG-DC 2	<p>Ecosystems are resilient or adaptive to the frequency, extent, and severity of disturbances, such as fire in fire-adapted systems, flooding in riparian systems, insects, pathogens, and climate variability.</p> <ul style="list-style-type: none"> a The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances, and to climate variability. b Vegetative communities reflect their natural physical, chemical, and biophysical processes with carefully managed human influence. c Non-climate ecosystem stressors (e.g., high road densities, water depletions, and air and water pollution) do not significantly impact the resilience and resistance of an ecosystem's ability to adapt to a changing climate. d Natural disturbance regimes, including fire, are allowed to function in their natural ecological role. Uncharacteristic fire (frequency and severity outside historical range for associated vegetation type) is minimal or absent on the landscape. e Landscape vegetation structure and patterns create a mosaic that disrupts large continuous areas of uncharacteristic high-severity fire effects. f Healthy, resilient vegetation contributes to the forest's ability to store carbon and function as a sustainable carbon sink.
FW-VEG-DC 3	<p>Ecosystems contain a mosaic of vegetation conditions, densities, and structures. This mosaic (as described in vegetation-type-specific desired conditions) occurs at a variety of scales across landscapes and watersheds, reflecting the disturbance regimes that naturally affect the area. Natural ecosystem functions (energy flow, hydrologic and nutrient cycling) facilitate the shifting of plant communities, structure, and ages across the landscape over time.</p>
FW-VEG-G 5	<p>Vegetation treatments should be designed such that structural stages and age classes that are under-represented in desired conditions become proportionally represented, and to assure continuous recruitment of old growth characteristics across the landscape over time.</p>
FW-VEG-G-1	<p>Management activities should favor the retention of species that naturally occurred in those ecosystems. Native species should be present in the relative proportions characteristic of those ecosystems.</p>

Component Code	Plan Component
FW-VEG-O 1	<p>Mechanically treat at least 10,000-80,000 acres, during each 10-year period following plan approval of Mixed Conifer with Frequent Fire. During each 10-year period following plan approval, treat at least 50,000-200,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or to maintain desired conditions of Mixed Conifer with Frequent Fire. Mechanically treat at least 15,000-100,000 acres, during each 10-year period following plan approval of Ponderosa Pine. During each 10-year period following plan approval, treat at least 50,000-200,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or to maintain desired conditions of Ponderosa Pine.</p>
FW-VEG-O 2	<p>Over a 10-year period, complete 2,500 to 50,000 acres of combined vegetation treatments in highly departed non-forested ERUs* to move vegetation toward desired conditions (i.e., restoration). Treatments may include mechanical treatments, prescribed fire or naturally ignited wildfires, seeding, or other techniques still to be determined by best available science depending on the specific ERU.</p> <p>* Highly departed non-forested ERUs are juniper grass (JUG), piñon juniper grass (PJG), Colorado Plateau Great Basin grassland (CPGB), sagebrush shrubland (SAGE), and montane subalpine grassland (MSG).</p>

Component Code	Plan Component
FW-SFF-DC 1	<p>SFF vegetation community is composed of multiple species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns, with groups and patches of variably sized and aged trees.</p> <ul style="list-style-type: none"> a Tree canopies are generally more closed than in mixed conifer forests. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition. b Patches of SFF vary, but most are hundreds of acres with rare patches that are thousands of acres, as a result of periodic disturbances (e.g., infrequent stand-replacing fire and bark beetle outbreaks). c Old growth generally occurs over large areas as stands or forests. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance. d Vegetation community is composed predominantly of vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provides snags and coarse woody debris, all well-distributed throughout the landscape. The number of snags and number of downed logs (larger than 12-inch diameter at mid-point, more than 8 feet long) and coarse woody debris (over 3-inch diameter) vary by seral stage. e Snags, 18 inches or larger at dbh, range from 5 to over 30 snags per acre, with the lower range of snags associated with early seral stages and the upper range associated with late seral stages. Snag density in general (larger than 8 inches dbh) averages 20 per acre with a range of 13 to 30. f Coarse woody debris, including downed logs, averages vary by seral stage, ranging from 5 to 30 tons per acre for early-seral stages; 30 to 40 tons per acre for mid-seral stages; and 40 or more tons per acre for late-seral stages.

Component Code	Plan Component
FW-SFF-DC 2	<p>Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Fires and other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.</p> <p>a Organic ground cover and herbaceous vegetation provide protection of soil and moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. The understory consists of native grass, forbs, and shrubs. In the lower spruce-fir type, shrub cover is variable and depends on Terrestrial Ecosystem Unit Inventory (TEUI) unit and plant composition similarity to site potential (e.g., FSH 2090.11) averages greater than 66 percent at the plan unit scale, but can vary considerably at finer scales.</p> <p>b Mixed- and high-severity fires occur in spruce-fir forests with frequencies longer than 200 years varying with elevation. In the lower spruce-fir type, mixed-severity fires (Fire Regime III) infrequently occur. In the upper spruce-fir type, high severity fires (Fire Regimes IV and V) occur very infrequently. Most fires are of limited scale and variable intensity. Natural and human-caused disturbances are sufficient to maintain natural processes and conditions.</p> <p>c Isolated instances of insect and disease infestations (e.g., Douglas-fir tussock moth, tent caterpillar) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of spruce-fir forests.</p>
FW-SFF-DC 3	<p>At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. There may also be small disturbances resulting in groups and patches of tens of acres or less. Grass-forb-shrub interspaces created by disturbance may involve single trees or comprise the entire mid-scale area after a major disturbance. Aspen is occasionally present in large patches.</p>
FW-SFF-DC 4	<p>Density ranges from 20 to 250 (or more) square feet per acre basal area based on age and site productivity, and depending on disturbance and seral stages of the groups and patches.</p>
FW-SFF-DC 7	<p>Forest conditions in some areas contain at least 10 percent higher basal area than the general forest (for example, goshawk post-fledging family areas and north-facing slopes). Nest areas have forest conditions that</p>

Component Code	Plan Component
	are multi-aged but dominated by large trees with relatively denser canopies than other areas in the spruce-fir type.
FW-MCW-DC 2	<p>Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. Natural and human-caused disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.</p> <p>a Mixed and high-severity fires occur in MCW, with a fire return intervals of 35 to 200 years or more (Fire Regimes III, IV, and V). Mixed-severity fire (Fire Regime III) is characteristic at lower elevations of this type. High-severity fires (Fire Regimes IV and V) are typically at higher elevations of this type, but rarely occur.</p> <p>b Isolated instances of insect and disease infestations (e.g., spruce budworm, Douglas-fir tussock moth, dwarf mistletoe, or tent caterpillar) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of MCW.</p>

Component Code	Plan Component
FW-MCW-DC 1	<p>The MCW vegetation community is composed of multiple species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns with groups and patches of variably-sized and aged trees and other vegetation associations. Tree canopies are generally more closed than in dry mixed conifer.</p> <ul style="list-style-type: none"> a Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition. b Patches are composed of variable species based on seral stages. Patch sizes vary, but are frequently hundreds of acres, with rare patches that are thousands of acres, as a result of infrequent disturbances. c Old growth generally occurs over large areas as stands or forests where the location shifts on the landscape over time as a result of succession and disturbance. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. d MCW communities are predominately vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provide snags and coarse woody debris, all well-distributed throughout the landscape. Number of snags and downed logs (larger than 12-inch diameter at mid-point, over 8 feet long) and coarse woody debris (more than 3-inch diameter) vary by seral stage. e Snags 18 inches or larger at DBH range from 1 to 5 snags per acre, where the lower range of snags of this size is associated with early seral stages and upper range is associated with late seral stages. Snag density in general (larger than 8 inches at dbh) averages 20 per acre. Coarse woody debris including downed logs, varies by seral stage, with averages ranging from 5 to 20 tons per acre for early-seral stages; 20 to 40 tons per acre for mid-seral stages; and 35 tons per acre or greater for late-seral stages. f The understory consists of native grass, forbs, and shrubs. Shrub cover depends on the TEUI unit. At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at finer scales due to a diversity of seral conditions.
FW-MCW-DC 3	<p>At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity (e.g., reference conditions indicate patches of 100 to 400 acres). Groups and patches of trees tens of acres or less are common, and are primarily even-aged. A mosaic of groups and patches vary in species composition, age, and size. Openness and prevalence of some species (e.g., aspen) is dependent on seral stages. Aspen is occasionally present in large patches. Grass-forb-shrub openings created</p>

Component Code	Plan Component
	by disturbance may comprise 10 to 100 percent of the mid-scale area, depending on the type of and time since disturbance.
FW-MCW-DC 4	Density ranges from 20 to 180 (or greater) square feet per acre basal area based on age and site productivity, and depending on time since disturbance and seral stages of the groups and patches.
FW-MCW-DC 7	Forest conditions in goshawk post-fledging family areas are similar to general forest conditions, except they typically contain 10 percent or higher tree density (basal area) relative to post-fledging family areas than goshawk foraging areas and the general forest. Nest areas have multi-aged forest conditions, with dominant large trees and relatively denser canopies than other areas in the MCW type.
FW-MCW-DC-8	In mid-aged and older forests, trees are typically variably spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking, occasionally with some single trees spaced apart from clumps. Trees within groups can be of similar or variable species and ages. Disturbances create small openings of varying size.
FW-MCD-10 and 11	Trees typically occur in irregularly shaped groups and are variably spaced with some tight clumps. Crowns of trees within the mid- to old-age groups are interlocking or nearly interlocking. Interspaces surrounding tree groups are variably shaped and composed of a grass/forb/shrub mix. Some natural openings contain individual trees or snags. Trees within groups are of similar or variable ages and one or more species. Size of tree groups typically is less than 1 acre. Groups at the mid- to old-age stages contain 2 to about 50 trees per group.

Component Code	Plan Component
FW-MCD-DC-1	<p>The MCD vegetation community is composed of multiple species of varying ages in a mosaic of seral stages and structures.</p> <ul style="list-style-type: none"> a The forest arrangement on the landscape is similar to historic patterns, with groups and patches generally of variably-sized and aged trees (uneven-aged) and occasional patches of even-aged structure interspersed within variably-sized openings of grass-forb-shrub vegetation. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms. Canopies are generally more open than in mixed conifer with aspen stands. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition. b Groups of MCD vary in size (although typically small groups), shape, number of trees per group, and number of groups per area across the landscape, creating a mosaic of patchiness. Where they naturally occur, groups of aspen and all structural stages of oak (e.g., Gambel oak) are present. c MCD communities are composed predominantly of vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provide snags and coarse woody debris (more than 3-inch diameter), all well-distributed throughout the landscape. The understory consists of native grass, forbs, and shrubs. d Old growth occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts across the landscape over time as a result of succession and disturbance.

Component Code	Plan Component
FW-MCD-DC 2	<p>Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity, and to climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Fire and other disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.</p> <p>a Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. Shrub cover depends on the TEUI unit and disturbance.</p> <p>b At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at fine- and mid-scales due to a diversity of seral state conditions.</p> <p>c Dwarf mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures.</p> <p>d Isolated instances of insect and disease infestations (e.g., spruce budworm, Douglas-fir tussock moth) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of MCD.</p>
FW-MCD-DC 4	<p>At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area. Groups and patches of trees are primarily uneven-aged with all age classes and structures present. Disturbances sustain the overall variation in age and structural distribution. Occasionally small patches (generally less than 60 acres) of even-aged forest structure are present, based on disturbance events and regeneration establishment.</p> <p>a A small percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand-replacement fire, and other disturbances.</p>

Component Code	Plan Component
FW-MCD-DC 5	Tree density within forested areas generally ranges from 30 to 125 square feet per acre basal area. Openness typically ranges from 50 percent in more productive sites to 90 percent in the less productive sites. Following major disturbances, grass-forb-shrub interspaces may comprise 10 to 100 percent of the mid-scale areas, depending on the type and time of disturbance.
FW-MCD-DC 6 and 7	Snags are typically 18 inches or greater in diameter at breast height and average 3 per acre. Smaller snags, 8 inches and above in diameter at breast height, average 8 snags per acre. Downed logs (greater than 12-inch diameter at mid-point, greater than 8 feet long) average 3 per acre within forested areas. Coarse woody material, including downed logs, ranges from 5 to 15 tons per acre.
FW-MCD-DC 9	Forest conditions in goshawk post-fledging family areas are similar to general forest conditions, except they typically contain 10 to 20 percent higher basal area in mid-old age tree groups than goshawk foraging areas and the general forest. Nest areas have multi-aged forest conditions, with dominant large trees and relatively denser canopies than are common in the rest of the mixed conifer-frequent fire type.
FW-MCD-DC-8	Ground cover consists primarily of perennial grasses and forbs capable of carrying surface fire, with basal vegetation values ranging between about 5 and 20 percent, depending on site potential and TEUI unit. Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.

Component Code	Plan Component
FW-PPF-DC 1	<p>The PPF vegetation community is composed of trees of varying ages in a mosaic of seral stages and structures. The forest arrangement on the landscape is similar to historic patterns, with groups and patches generally of variably-sized and aged trees (uneven-aged) and occasional patches of even-aged structure, interspersed within variably sized openings of grass-forb-shrub vegetation associations. Denser stand conditions exist in some locations, such as north-facing slopes and canyon bottoms. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.</p> <p>a Groups of PPF vary in size (although typically small (a few trees to 1+ acre))shape, number of trees per group, and number of groups per area across the landscape, creating a mosaic of patchiness. Where they naturally occur, in the Gambel oak sub-type, all structural stages of oak trees are present.</p> <p>b The PPF vegetation community is predominantly composed of vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provides for snags and coarse woody debris (over 3-inch diameter), all well-distributed throughout the landscape.</p> <p>c Old growth occurs throughout the landscape, generally in small areas (e.g., less than 1 acre) as individual old growth components or as clumps of old growth. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts across the landscape over time as a result of succession and disturbance.</p> <p>d Dwarf-mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures.</p> <p>e Frequent, low-severity fires (Fire Regime I) are characteristic in this type, including throughout goshawk home ranges, with fire return intervals of 4 to 30 years. Fires burn primarily on the forest floor and do not spread between tree groups as crown fire. Grasses, forbs, shrubs, litter (e.g., cones, needles, fine woody fuels, 10-hour-fuels, and previous years' debris from grasses, forbs, and shrubs), and small trees maintain the natural fire regime.</p>

Component Code	Plan Component
FW-PPF-DC 2	<p>Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, severity, and to climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Natural and human-caused disturbances are sufficient to maintain desired overall tree density, structure, species compositions, coarse woody debris, and nutrient cycling.</p> <p>a Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. The understory consists of native grass, forbs, and shrubs. The amount of shrub cover depends on TEUI unit and disturbance. At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at finer scales due to a diversity of seral conditions.</p> <p>b Isolated instances of insect and disease infestations (e.g., bark beetle and dwarf mistletoe) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of PPF.</p>
FW-PPF-DC 3	<p>At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Mosaics of tree groups and patches of trees make up an uneven-aged forest with all age classes present. Disturbances sustain the overall variation in age and structural distribution.</p> <p>a Occasionally small patches (generally less than 50 acres) of even-aged forest structure are present, based upon disturbance events and regeneration establishment.</p> <p>b A small percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand-replacement fire, and other disturbances.</p>
FW-PPF-DC 4	Density within forested areas ranges from 22 to 89 square foot basal area per acre.
FW-PPF-DC 5	Openness typically ranges from 52 percent in more productive sites to 90 percent in less productive sites. In areas with high fine-scale aggregation of trees into groups, mid-scale openness ranges between 78 to 90 percent.

Component Code	Plan Component
FW-PPF-DC 6 and 7	Ponderosa pine snags are typically 18 inches or greater in diameter at breast height and average 1 to 2 snags per acre. In the Gambel oak subtype, large oak snags (greater than 10 inches in diameter at breast height) persist in microsites. Downed logs (greater than 12 inches in diameter at mid-point, greater than 8 feet long) average 3 logs per acre within the forested area of the landscape. Coarse woody material, including downed logs, ranges from 3 to 10 tons per acre.
FW-PPF-DC 9	Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.
FW-PPF-DC 10	Forest conditions in some areas contain 10 to 20 percent higher basal area in mid-aged to old tree groups than in the general forest (for example, goshawk post-fledging family areas, Mexican spotted owl nesting and roosting habitats, drainages, and steep north-facing slopes). Goshawk nest areas have forest conditions that are multi-aged but dominated by large trees with relatively denser canopies than other areas in the ponderosa pine type.
FW-PPF-DC 11	Trees typically occur in irregularly shaped groups and are variably spaced with some tight clumps. Crowns of trees within the mid- to old-age groups are interlocking or nearly interlocking. Interspaces surrounding tree groups are variably shaped and comprised of a grass/forb/shrub mix. Some natural openings contain individual trees. Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Size of tree groups typically is less than 1 acre but averages 0.5 acres. Groups at the mid- to old-age stages consist of 2 to approximately 40 trees per group.
FW-VEG-PJO-DC 1	Pinyon-juniper woodland (persistent) is characterized by even-aged patches of pinyons and junipers that form multi-aged woodlands at the landscape level. The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances (for example, insects, diseases, and fire), and climate variability. Insects and disease occur at endemic levels. Fire as a disturbance is less frequent and variable due to differences in ground cover, though some sites are capable of carrying surface fire. The fires that do occur are mixed to high severity (fire regime groups III, IV, V). Seral stage proportions are applied at the landscape scale (see USFS 2021 for more information), where low overall departure from reference proportions is a positive indicator of ecosystem condition.

Component Code	Plan Component
FW-ALP-DC 3	Alpine ecosystems occupy harsh high-elevation sites, resulting in short stature and relatively slow growth for both shrubs and herbaceous species. Wetland communities are present in snowloaded depressions and are dominated by plane leaf willow, snow willow, and arctic willow. Alpine fell-fields ¹ are dominated by alpine clover, alpine avens, Bellardi bog sedge, and a variety of other forbs, graminoids, and dwarf willows. Conservation of this ERU allows for the persistence of alpine-obligate wildlife such as white -tailed ptarmigan
FW-ALP-DC 4	Key features such as boulder fields and talus slopes, which are necessary to allow for persistence of alpine larkspur, white-tailed ptarmigan, and other alpine-dependent plant and animal species (e.g., marmots, pika, and bighorn sheep), are well distributed and undisturbed, within the capacity of the vegetation community.
FW-WUI-DC 3	<p>Ecosystem structure promotes low-intensity surface fires in areas where the WUI intersects vegetation types with a mixed- or high-severity fire regimes (e.g., SFF and MCW).</p> <ul style="list-style-type: none"> a Tree basal area reflects the low end of the range within the desired conditions for individual vegetation types. b Ladder fuels are nearly absent. c Openings between tree groups are of sufficient size to discourage isolated group torching from spreading as a crown fire to other groups. Trees within groups may be more widely spaced with less interlocking of the crowns than desirable in adjacent forest lands. Openings with grass/forb/shrub vegetation occupy the mid to upper end of the percentage range in the desired conditions.
FW-WUI-DC 4	Dead and down fuel load is between 1 and 10 tons per acre, depending on ERU, with lower amounts in fire-adapted ERUs, and higher amounts in infrequent fire types. These light fuel loads are desirable even in vegetation types with higher reference fuel loads, such as mixed conifer with aspen or spruce-fir, to provide improved fire protection to human developments of special significance. Logs and snags are present in the WUI at the lower end of the range given in the vegetation community desired conditions.
FW-FIRE-DC 1	Wildland fires do not result in the loss of life, property, or cultural resources, or create irreparable harm to ecological resources.

Component Code	Plan Component
FW-FIRE-DC 2	Wildland fires protect, maintain, and enhance resources and move ecosystems toward desired conditions on a landscape scale. Wildland fire functions in its natural ecological role on a landscape scale and across administrative boundaries, under conditions where safety and values at risk can be protected. In frequent-fire systems, regular use of fire mitigates high-severity disturbances and protects social, economic, and ecological values at risk.
FW-FIRE-DC 3	Wildfires burn within the range of severity and frequency of historic fire regimes for the affected vegetation communities. High-severity fires rarely occur where they were not historically part of the fire regime.
FW-FIRE-DC 4	Naturally ignited wildfires predominate; human-caused wildfires (such as those from abandoned campfires or downed powerlines) are rare.
FW-FIRE-DC 6	All restoration and fuel treatments result in ecological resources that are adaptable to the effects of changing climate conditions.
FW-FIRE-G 1	Naturally ignited wildfires should be allowed to perform their natural ecological role to meet multiple resource objectives and facilitate progress toward desired conditions. Naturally ignited wildfires should only be suppressed when not expected to achieve desired conditions or where necessary to protect life, investments, and valuable resources.
FW-FIRE-G 3	Response to wildfires that cross jurisdictional boundaries should be coordinated and managed to meet the responsible agency's objectives.
FW-FIRE-G 6	Measures should be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease, when drafting (withdrawing) water from streams or other waterbodies during fire management activities.
FW-FIRE-G 7	Measures should be taken to prevent the spread of invasive plant species by equipment and personnel during fire management and rehabilitation operations.

Component Code	Plan Component
FW-FIRE-G 8	Post-fire restoration and recovery should be provided where critical resource concerns merit rehabilitation for controlling the spread of invasive species and, protection of areas of cultural concern, critical or endangered species habitat, or other highly valued resources such as drinking water.
FW-FIRE-G 9	Higher fire severities should be acceptable at the fine scale in frequent-fire ecosystems that are moderately to highly departed from desired conditions. Multiple small patches of high severity are preferable to a single large, high-severity area.
FW-FIRE-G 11	Depth of masticated materials should not exceed an average of 4 inches and materials should be discontinuous at the quarter-acre scale to protect the soil and allow for natural revegetation.
FW-FIRE-S 3	When suppression is an objective, the agency administrator must consider firefighter exposure, risk, values, cost, and likelihood of success, before trying to limit the size of wildfires.
FW-WATER-DC 1	<p>Watersheds are functioning properly according to metrics described by the Watershed Condition Framework, other current protocols, and Properly Function Condition (PFC) protocols. Functioning watersheds have the following characteristics:</p> <ul style="list-style-type: none"> a Provide for high biotic integrity (habitats that support self-sustaining assemblages of native plant and animal communities); b Are resilient to natural and human-caused disturbances such as fire and climate fluctuations with the ability to recover to reference conditions within the natural range of variability (from Santa Fe National Forest Assessment, USDA-Forest Service 2013a) following disturbance; c Exhibit a high degree of connectivity where instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations. In addition, streamflows provide connectivity among fish populations and provide unobstructed routes critical for fulfilling needs of aquatic, riparian-dependent, and many upland species of plants and animals. (Also see DC #3 and #4 in this section.); d Maintain long-term soil productivity; and e Provide a wide range of sustainable ecosystem services including clean water (DC#3), water quantity to maintain PFC, and other supporting and regulatory services described in DC #2 and #4)

Component Code	Plan Component
FW-WATER-DC 2	Most watersheds support multiple uses (e.g., timber, cultural uses, traditional uses, human subsistence, recreation, and grazing) with no long-term decline in ecological conditions, although some watersheds are reserved to preserve ecological functions.
FW-WATER-DC 5	The flow regime (magnitude, timing, duration, frequency, and rate of change) of streams is sustained at levels that maintain or enhance essential ecological functions; including channel and floodplain morphology, groundwater recharge, water quality, nutrient cycling, and stream temperature regulation.
FW-WATER-DC 6	Channel type (width/depth ratio, sinuosity, gradient, etc.) is appropriate for the landscape setting (e.g., landform, geology, and bioclimatic region). Stream channels are vertically and laterally stable.
FW-WATER-S 1	Best management practices (BMPs, e.g., National Core Technical Guide for BMPs (FS-990A), FSH 2509.22 - Soil and Water Conservation Practices Handbook) must be used to minimize management impacts to maintain water quality.
FW-RWE-DC 1	<p>Riparian ecosystems have a diverse composition of desirable native plants that contain a mosaic of communities, creating a structurally robust vegetative network that protects the soils from unnatural erosion. Departure from site potential is low (less than 33 percent) (Wahlberg et al. 2013).</p> <ul style="list-style-type: none"> a Woody vegetation within forested and shrubland riparian areas and wetland ecosystems display a variety of size classes; they provide terrestrial and aquatic habitats, stream shading (temperature regulation), woody channel debris, aesthetic values, and other ecosystem functions. b Invasive plant species are absent (per Desired Condition 1 in Wildlife: Nonnative and Invasive Species). c Riparian communities are free from encroachment by upland species and the extent of riparian communities is expanding or has achieved potential extent. d The composition, structure, and function of biotic and abiotic components of the HERB riparian vegetation community are within the natural range of variability.

Component Code	Plan Component
FW-RWE-DC 4	<p>Riparian areas and wetland ecosystems meet the standards defined by proper functioning condition metrics (e.g., Prichard et al. 1998). RE and WE are supported by surface and subsurface flow regimes that contribute to stream-channel and floodplain development, maintenance, and function; which maintain soil moisture necessary for riparian connectivity and for the regeneration of native plants that depend on flooding or high water tables.</p> <ul style="list-style-type: none"> a Stream channels, riparian areas, and wetland ecosystems are resilient to ecological disturbances (e.g., floods, fire, drought, and changes in climate) and human activities (e.g., roads, livestock, and recreation). b RE and WE are widening or have achieved potential extent and are within their natural range of variability. c Overall wetland condition score of 'A' or 'B' or equivalent rating for proper functioning condition (sensu Prichard et al. 2003)
FW-RWE-G 1	<p>1 Riparian management zones (RMZ) should be defined to include either a site-appropriate delineation of the riparian area or a buffer of 100 feet from the edges (e.g., each stream bank at bankfull or edge of the water body) of all perennial and intermittent streams, lakes, seeps, springs, and other wetlands or 15 feet from the edges of the ephemeral channels. The waterbody itself is considered part of the RMZ. The exact width of RMZs may vary based on ecological or geomorphic factors or by waterbody type, but includes those areas that provide riparian and aquatic ecosystem functions and connectivity.</p>
FW-RWE-G 2	<p>Within RMZs, management activities (e.g., recreation, permitted uses, structural developments such as livestock water gaps, pipelines, or other infrastructure) should occur at levels or scales that move toward desired conditions for water, soils, aquatic species habitat, and vegetation within the sub-watershed in which the management activity is taking place, and align with the most current regional riparian strategy. Activities and facilities with a small footprint (e.g., access points, intermittent livestock crossing locations, water gaps, or other infrastructure) may be necessary to manage larger scale impacts within the RMZ, recognizing there may be trade-offs between activities and resources.</p>
FW-RWE-G 7	<p>Herbivory of riparian plants should not cause long-term trends away from desired riparian conditions.</p>

Component Code	Plan Component
FW-RWE-O 1	Riparian ecosystems move toward desired conditions (less than a 33 percent departure from DC) for vegetation functional diversity, vegetation seral state, riparian corridor connectivity, and flood regime (frequency, duration, and magnitude) by implementing 15 miles of stream restoration every 10 years.
FW-AQUASH-DC 1	<p>Aquatic habitats are distributed across the forest in sufficient quantity (redundancy and size) and with appropriate habitat components to support self-sustaining populations of native fish and other aquatic species. Nonnative sportfish are supported in stream reaches where there is strong recreational interest and where they do not conflict with native species repatriation efforts. High-quality habitat consists of:</p> <ul style="list-style-type: none"> a Pool-to-riffle ratio of at least 30 percent of the stream reach. b Pool quality with average residual pool depth of 12 or more inches. c Less than 20 percent fines (sand, silt, clay) in riffle habitat. d Appropriate width-to-depth ratios for the stream channel type (Rosgen or equivalent). e Streambank condition is less than 10 percent unstable banks (lineal streambank distance). f At least 60 percent of woody riparian cover consists of at least three native plant species or where soil characteristics do not support woody vegetation, native obligate wetland species dominate herbaceous bank cover. g In forested streams, large woody debris consists of more than 30 pieces per mile, larger than 12 inches in diameter, and over 35 feet in length. h Large-diameter trees and snags near stream channels and riparian areas exist in a quantity that provide for recruitment of large woody material to stream channels.
FW-AQUASH-DC 2	<p>Aquatic habitats and waterbodies (e.g., lakes, ponds, and reservoirs) support a complete assemblage of native aquatic species and are resilient to natural and human disturbances including projected warmer and drier climatic conditions. Habitat resiliency is maintained or increased when:</p> <ul style="list-style-type: none"> a Undesired and invasive aquatic species, as well as introduced pathogens, are rare or absent (per Desired Condition 1 in Wildlife: Nonnative and Invasive Species). b Desirable nonnative fish exist in less than 50 percent of aquatic habitats across the forest and provide for a broad range of sport-fishing opportunities. c Water quality and quantity meet designated uses, consistent with water rights and site capability.

Component Code	Plan Component
FW-AQUASH-DC 4	<p>Aquatic species' habitat conditions provide redundancy necessary to maintain species biodiversity and functioning metapopulations (an interconnected group of subpopulations separated by space but consisting of the same species).</p> <p>a Aquatic habitats are connected and free from alterations (e.g., temperature regime changes, lack of adequate streamflow, and barriers to aquatic organism passage) to allow for species migration, connectivity of fragmented populations and genetic exchange. Barriers to movement are located where necessary to protect native fish from nonnative species.</p>
FW-AQUASH-G 2	<p>Human-made structures (e.g., instream structures or fencing) should be maintained to support the purposes for which they were built or removed when no longer needed.</p>
FW-AQUASH-G 4	<p>Management of coldwater streams should include adequate vegetation cover (as defined by Desired Conditions within the Riparian Ecosystems section) and width-to-depth ratio to move toward State of New Mexico standards for stream water temperatures for "High Quality Coldwater" systems.</p>
FW-TERRASH-DC 1	<p>Terrestrial ecosystems are composed of appropriate (native) assemblages of sustainable populations of plant and animal species that are supported by healthy ecosystems.</p> <p>a A diversity of habitat components, including biotic and abiotic features, are available at the appropriate spatial, temporal, compositional, and structural levels (as defined by Desired Conditions for each Vegetation ERU) to provide adequate opportunity for breeding, feeding, nesting, and other critical life history needs of wildlife, so that forest species remain viable and persistent on the landscape.</p> <p>b Undesired nonnative and invasive terrestrial species, as well as introduced pathogens, are rare or absent (per Desired Condition 1 in Wildlife: Nonnative and Invasive Species).</p> <p>c Terrestrial habitats allow for the maintenance and promotion of interspecific relationships at all trophic levels (e.g., producer-consumer and predator-prey relationships) across multiple scales, consistent with existing landforms and topography.</p>
FW-TERRASH-DC 3	<p>Wildlife are free from harassment and human disturbance at a scale that does not impact vital functions of populations (e.g., breeding, feeding, rearing young, migration, and dispersal) resulting in a negative impact to the persistence of the species in the forest.</p>

Component Code	Plan Component
FW-TERRASH-G 2	Infrastructure (e.g., fences and roads) should be designed, modified, or removed to minimize impacts on wildlife movement and improve habitat connectivity.
FW-TERRASH-G 3	Activities negatively impacting wildlife reproduction or other vital functions should be minimized (e.g., closures during elk calving), except if management activities are implemented to control wildlife populations to protect the overall health of the habitat or other populations (e.g., NMDGF regulations).
FW-TERRASH-G 4	Management activities that inhibit the reproduction of an individual raptor (disturbing the same nest site) should be avoided in successive years (e.g., via the development of species-specific distance buffers focusing around known nest sites).
FW-INVASIVE- DC 1	Invasive species (including pathogens) are nonexistent or exist at population levels that do not disrupt ecological functioning, affect the sustainability of native species, cause economic harm, or negatively impact human health.
FW-INVASIVE- DC 2	Nonnative species do not conflict with the recovery of native species, negatively influence ecosystem function, or detract from existing multiple uses.
FW-INVASIVE-S 1	Forest management actions must apply best management practices (e.g., Forest Service Handbook, Region 3 Soil and Water Conservation Practices Handbook) to minimize the introduction or spread of invasive species, including: a Decontamination procedures on vehicles and equipment used in terrestrial and aquatic environments. b Using weed-free products
FW-INVASIVE-S 2	Projects, authorized activities, and special uses shall be designed (for example, weed hay, off-highway vehicle washing, waders) to reduce the potential for introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial nonnative populations.
FW-INVASIVE-S 4	Treatment approaches should use integrated pest management practices to treat noxious and nonnative, invasive species. These practices include mechanical or physical, cultural, biological, and chemical control.

Component Code	Plan Component
FW-ATRISK-DC-1	Ecological conditions (physical and biotic) contribute to the survival and recovery of federally listed, proposed, and candidate species; preclude the need for listing new species; and allow for the recovery and persistence of species of conservation concern.
FW-ATRISK-DC-2	Intact, functioning, and sufficient habitat for terrestrial and aquatic at-risk species (defined by Desired Conditions for each Vegetation ERU) provide for opportunity for breeding, feeding, nesting, and other critical life history needs of wildlife, so the species remains viable and persistent on the landscape.
FW-ATRISK-DC 3	Habitats for at-risk species, including rare and endemic populations, are known (locations) to be intact, functioning, well-connected, and sufficient for species' persistence.
FW-ATRISK-G 2	Project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan.
FW-ATRISK-G 3	Where the Forest Service has entered into a signed conservation agreement that provides guidance on activities or actions to be carried out by the Santa Fe National Forest personnel, those activities or actions should be undertaken consistent with the guidance found within the conservation agreement, to maintain the persistence or contribute to the recovery of federally listed species.
FW-ATRISK-G 8	Heavy equipment should be kept out of streams during spawning, incubation, and emergence periods (e.g., spring to early summer for fish species) of aquatic at-risk species (per Guideline 1a in this section) except when short-term uses are required to improve resource conditions and maintain infrastructure.
FW-ATRISK-G 10	In areas that produce piñon seeds, mitigation measures for the collection of forest products (e.g., collection of dead or down, tree diameter restrictions, restrictions on size of fuelwood area) should be used to reduce impacts to piñon-producing trees and benefit at-risk species.
FW-ATRISK-G 12	Large mature cottonwood trees should be retained as habitat for at-risk species unless necessary to meet management objectives or ensure public safety.

Component Code	Plan Component
FW-SOIL-DC 1	Soil productivity, function, and inherent physical, chemical, and biological processes remain intact or are enhanced. Soils can readily absorb, store, and transmit water vertically and horizontally; accept, hold, and release nutrients; and resist erosion.
FW-SOIL-DC 2	Vegetative cover and litter are distributed across the soil surface in adequate amounts to limit erosion and contribute to soil deposition, development, productivity, and carbon cycling. Soil cover and herbaceous vegetation protect soil, facilitate infiltration, and contribute to plant and animal diversity and ecosystem function.
FW-SOIL-DC 7	Soils do not exhibit accelerated or unnatural signs of erosion (e.g., pedestaling, rills, or gullies caused by human uses).
FW-SOIL-G 1	Ground-disturbing management activities should be designed to minimize short- and long-term adverse impacts to soil resources (e.g., soil compaction and soil loss). Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed. When soil conditions are less than satisfactory as a result of management activities, restoration of soil condition should occur.
FW-SOIL-G 2	Poorly drained or saturated soils should not have mechanized equipment operating on them.
FW-SOIL-G 3	In project areas where ground disturbance could affect biological soil crusts, intact soil crusts should be identified and protected as source populations.
FW-SOIL-G 4	In areas where soils have a severe erosion hazard rating (as defined in the TEUI) or are poorly drained or saturated or unsatisfactory soil condition, new activities that encourage concentrated use (e.g., recreation, log landings, stock tanks, mineral blocks, corrals, and cattle collection areas) should be avoided.
FW-SOIL-S 1	Best management practices (BMPs; e.g., National Core Technical Guide for BMPs (FS-990A), FSH 2509.22 - Soil and Water Conservation Practices Handbook) and soil quality monitoring (e.g., Technical Guidance for Assessing and Monitoring Soil Quality in the Southwestern Region) must be used to minimize management impacts to ensure long-term soil productivity and satisfactory soil condition (soil health).

Component Code	Plan Component
FW-AIR-DC 1	Air quality meets or surpasses State and Federal ambient air quality standards.
FW-AIR-DC 2	Visibility in designated wilderness areas (Class I and sensitive Class II areas) is free of anthropogenic (human-caused) impacts.
FW-AIR-DC 3	Good air quality contributes to visibility, human health, quality of life, economic opportunities, quality recreation, and wilderness values.
FW-AIR-DC 4	There are no measurable exceedances to water chemistry or biotic components due to atmospheric deposition of pollutants.
FW-AIR-G 1	Dust abatement should occur, using non-potable water where feasible, during construction and road projects where dust is a potential effect.
FW-TRIBES-DC 3	Forest resources important for cultural and traditional needs, as well as for subsistence practices and economic support of tribal communities, are available and sustainable.
FW-TRIBES-DC 6	Traditional cultural properties, sacred sites, and other locations of traditional and cultural use identified as important to federally recognized tribes are unimpaired.
FW-RURALH-DC 3	Forest resources important for cultural and traditional needs, as well as for subsistence practices and economic support (such as livestock grazing, acequias, and forest products) of rural historic communities are available and sustainable.
FW-RURALH-G 1	Traditionally used products (such as fuelwood, latillas, and vigas) should be available on the national forest to rural historic communities, except in areas with resource concerns or in designated areas where such uses are not allowed or otherwise restricted by standards or guidelines set forth in other sections of this plan.

Component Code	Plan Component
FW-ARCH-DC 1	<p>Cultural and historic resources (including archaeological sites, historic buildings and structures, traditional cultural properties) are stable and are maintained in a manner that does not adversely affect their integrity, including:</p> <ul style="list-style-type: none"> a Visual and aesthetic integrity and physical association with culturally significant landscapes b Surrounding landscapes that are resilient to natural ecological processes c Long-term stability with other forest uses and the absence of vandalism, looting, or other human impacts d Dual roles with administrative, recreational, or infrastructure facilities.
FW-FORESTRY-DC 1	<p>Forest products (such as fuelwood, latillas, vigas, Christmas trees, herbs, medicinal plants, and pinyon nuts) are available to businesses and individuals in a sustainable manner (forest products recover between collections) where consistent with other resource needs that also effectively contributes to watershed health and the restoration and maintenance of desired vegetation conditions.</p>
FW-FORESTRY-DC 2	<p>Forest products are available for traditional communities and culturally important activities and contribute to the long-term socioeconomic diversity and stability of local communities.</p>
FW-FORESTRY-DC 3	<p>Forest products that are a by-product of management activities (such as fuelwood) are available for personal use by the public where consistent with other resource needs.</p>
FW-FORESTRY-DC 4	<p>Private and commercial timber harvest supplements other restoration and maintenance treatments at a scale that achieves landscape-level desired conditions and contributes to watershed restoration, function, and resilience; enhances wildlife habitat; creates opportunities for small and large businesses and employment in balance with other resource needs and concerns; and provides wood products.</p>
FW-FORESTRY-DC 5	<p>Harvest of dead and dying trees for economic value is consistent with the desired conditions of wildlife habitat, soil productivity, scenic integrity objectives, and ecosystem functions.</p>

Component Code	Plan Component
FW-FORESTRY-G 1	<p>On suitable timberlands, regeneration harvest of even-aged stands should have reached or surpassed 95 percent of the culmination of mean annual increment, unless it is needed to:</p> <ul style="list-style-type: none"> a Reduce fire hazard within the wildland-urban interface (WUI), b Contribute toward achieving the desired uneven-aged vegetation conditions over the long term, or c Treats unsustainable stand conditions resulting from insects, disease, or other damage agents.
FW-FORESTRY-G 2	<p>Log landing areas should be located outside of mapped sensitive areas (e.g., riparian management zones, wetlands, archeological sites, threatened and endangered critical habitat, and along Scenery Management System Concern Level I Routes). When landings must be located in these areas, effects to the sensitive resource will be mitigated.</p>
FW-FORESTRY-O 1	<p>Provide at least 177,000 CCF per decade to contribute to local forest product industry and for personal use, including 92,850 CCF (72,539 cords) per decade of fuelwood.</p>
FW-FORESTRY-S-1	<p>Regulated timber harvest (tree harvest for the purposes of timber production) must occur only on lands classified as suitable for timber production (16 U.S.C. 1604).</p> <ul style="list-style-type: none"> a On lands suitable for timber production, timber harvest intended to create openings for tree regeneration must only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest. b Timber harvest would occur only where soil, slope, or watershed conditions would not be irreversibly damaged. c Timber will be harvested only where protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water. d Timber harvest will be carried out consistent with the protection of soil, watershed, fish, wildlife, traditional use resources, cultural and historic resources, recreation, and aesthetic resources. e Timber will be harvested only where the harvesting system is not selected primarily because it will give the greatest dollar return or unit output of timber.
FW-RANGE-DC 3	<p>Rangelands are resilient to disturbances and variations in the natural environment (such as fire, flood, and climate variability).</p>

Component Code	Plan Component
FW-RANGE-DC 4	Livestock grazing is compatible with ecological functions and processes (such as water infiltration, wildlife habitat, soil stability, and natural fire regimes). Livestock grazing is also compatible with social resources of the national forest included designated areas (like wilderness).
FW-RANGE-DC 5	Native plant communities support diverse age classes of shrubs, and vigorous, diverse, self-sustaining understories of grasses and forbs relative to site potential, while providing forage for livestock and wildlife.
FW-RANGE-DC 6	Wetland and riparian areas consist of native obligate wetland species and a diversity of riparian plant communities consistent with site potential and relative to riparian desired conditions.
FW-RANGE-G 1	Forage use should be based on current and desired ecological conditions and livestock use as determined during planning cycles (such as annual operating instructions and permit renewal), to sustain livestock grazing and maintain ecological function and processes.
FW-RANGE-G 2	Livestock grazing within riparian management zones should be managed to sustain proper stream channel morphology, floodplain function, and riparian vegetation desired conditions.
FW-RANGE-G 3	New livestock troughs, tanks, and holding facilities should be located away from riparian management zones to protect riparian ecological resources and to minimize long-term detrimental impacts, unless necessary for resource enhancement or protection.
FW-RANGE-G 4	New range infrastructure (such as troughs and tanks) should be designed to avoid long-term negative impacts to soil resources (like soil compaction and soil loss) to maintain hydrological function outside the structure's footprint.
FW-RANGE-G 5	Salting or mineral supplementation should not occur on or adjacent to areas that are especially sensitive to salt (such as at-risk plant species habitat, riparian areas, wetlands, or archeological sites) and where there is increased traffic from ungulates to protect these sites.

Component Code	Plan Component
FW-RANGE-G 6	Restocking and management of grazing allotments following a major disturbance (such as fire or flood) should occur on a case-by-case basis after consideration of site-specific resource conditions.
FW-RANGE-G 7	Vacant or understocked allotments should be considered for livestock use with permitted livestock during times or events when other active allotments are unavailable or require ecosystem recovery as a result of natural disturbances like wildfire or management activities such as vegetation restoration treatments.
FW-RANGE-G 8	Grazing of domestic sheep or goats should not be authorized in areas occupied by bighorn sheep to minimize the spread of disease between domestic and wild populations.
FW-RANGE-O 1	Annually remove, improve, or reconstruct at least 5 percent of the forest's range infrastructure that is no longer necessary or in poor or non-functional condition.
FW-RANGE-S 1	Livestock management shall be compatible with capacity and address ecological concerns (such as forage, invasive plants, at-risk species, soils, riparian health, and water quality) that are departed from desired conditions, as determined by temporally and spatially appropriate data.
FW-RANGE-S 2	New or reconstructed fencing shall allow wildlife passage, except where specifically intended to exclude wildlife (like an elk enclosure fence) or to protect human health and safety.
FW-RANGE-S 3	New and reconstructed range improvements must be designed to prevent wildlife entrapment and provide safe egress for wildlife (for example, escape ramps in water troughs and cattle guards).
FW-REC-DC 3	Sustainable recreation opportunities are variable (e.g., recreation settings, activities, and seasonality); adaptable to changing uses and trends; and available commensurate with public interest, resource capacity, and other natural and cultural resource values.
FW-REC-DC 4	Conflicts among various recreation uses and other forest uses (such as grazing) are rare. There is minimal vandalism, theft, illegal activity, or resource damage on the national forest from recreation activities.

Component Code	Plan Component
FW-REC-S 1	Management activities that would substantially diminish recreation experiences (e.g., diminishing the scenic setting, facility construction or repair, or timber cutting) should not be scheduled at popular developed sites on weekends or holidays during the major recreation season (e.g., between Memorial Day and Labor Day), except in cases of wildland fire management or when doing so would otherwise not achieve project goals.
FW-DEVREC-G 4	Recreation facilities and improvements should be designed to prevent human and wildlife conflicts. For example, use animal-resistant trash cans and cap or screen pipes on gates, vault toilet vents, interpretive sign bases, and reroute multi-use trails to avoid seeps and springs used by wildlife.
FW-DISREC-DC 1	Dispersed recreation opportunities range from remote backcountry solitude to roadside sites along popular corridors. Dispersed recreation is consistent with management tools (e.g., the MVUM and desired ROS classes) and does not adversely affect ecological resources.
FW-DISREC-DC 2	The design, construction, and maintenance of trails creates a trail system that is sustainable and consistent with user desires, enhances the recreation experience, diminishes user conflicts, and minimizes damage to other resources.
FW-DISREC-G 1	Trails should be designed, constructed, rerouted, decommissioned, or maintained using current best practices to promote sustainable design while providing desired recreation opportunities and protecting the values of other resources.
FW-DISREC-G 3	Trails should not be used for management activities that may negatively impact the trail, such as for landings and as skid trails. Impacts to system trails should be avoided and mitigated upon project completion if unavoidable.
FW-DISREC-G 4	All trails (motorized and non-motorized) that adversely impact cultural resources or at-risk species should be mitigated or closed, or alternative travel routes should be developed. New trails should avoid the riparian management zone and have limited stream crossings.

Component Code	Plan Component
FW-DISREC-O 2	Verify and correct proper signage and alignment of trails on the ground and with maps and geospatial data (i.e., cartographic accuracy) for at least 25 percent of system trails every 3 years.
FW-DISREC-S 1	Motorized uses are prohibited in ROS settings desired to be primitive.
FW-DISREC-S 2	Motorized uses are prohibited in semiprimitive-nonmotorized desired ROS settings, except for necessary administrative activities, permitted activities, and emergency access.
FW-DISREC-S 3	In semiprimitive-nonmotorized desired ROS settings, no new permanent motorized routes or areas shall be constructed or designated. Temporary motorized routes or road construction in semiprimitive-nonmotorized settings must be rehabilitated within 2 years of project completion.
FW-RECSU-DC 1	Recreation special-use authorizations (e.g., outfitters and guides, competitive races, family reunions, special events, and Ski Santa Fe) provide unique opportunities, services, and experiences for the recreating public and address a demonstrated demand for a specific recreation opportunity.
FW-RECSU-DC 4	Services provided by recreation special uses enhance the recreation experiences of national forest visitors, increase public understanding and respect for the Santa Fe and nearby communities, provide for public health and safety, and have minimal impact to ecological and cultural resources.
FW-RECSU-G 1	Special uses authorizations for recreation events and outfitting and guiding services should be analyzed relevant to any current and future capacity studies, administrative capabilities and should use tools that assist in efficiencies to the special use program.
FW-RECSU-G 5	New special use authorizations for utility distribution, including electricity distribution less than 46kV in capacity, should be buried if physical site conditions permit, to reduce fire hazard and minimize resource impacts.

Component Code	Plan Component
FW-RECSU-G 9	Dispersed activities (non-motorized and motorized) authorized under special uses authorizations should be limited to existing National Forest System trails and roads unless authorized, to protect national forest resources.
FW-ROADS-DC 1	Safe transportation system and infrastructure accommodate needs for public access, land and resource management, and permitted activities, while contributing to social and economic sustainability.
FW-ROADS-DC 2	Unauthorized access and non-system routes are not causing adverse impacts to environmental or cultural resources.
FW-ROADS-DC 3	Forest roads, bridges, and trails provide safe and reasonable access for traditional and cultural uses.
FW-ROADS-DC 5	Use of National Forest System roads does not hinder wildlife movement or interrupt critical life-cycle needs (such as calving, nesting, or breeding).
FW-ROADS-DC 6	National Forest System roads are well marked and provide for traveler safety and information.
FW-ROADS-G 10	If at-risk species are present and will be impacted by road construction or maintenance activities, work should be conducted to avoid or minimize noise and habitat disturbance and outside of critical life-cycle periods (e.g., breeding or nesting for birds) or when animals may not be present (e.g., during migration).
FW-ROADS-G 2	To offset resource damage from construction of new or temporary roads, decommissioning or closing other roads, unauthorized routes, or trails should take place in the same watershed.
FW-ROADS-G 7	Reconstruction and rehabilitation of existing roads should be emphasized over new road construction.
FW-ROADS-G 8	Temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects should be decommissioned and rehabilitated upon project completion.

Component Code	Plan Component
FW-XBOUND-DC 8	The transition from forest NFS lands to adjacent lands with similar desired conditions is seamless and does not exhibit abrupt changes in visual or ecological integrity.
FW-REALTY-G 2	Land ownership adjustment should result in the creation of a more contiguous land base, and should not create isolated NFS parcels surrounded by lands of other ownership or isolated lands of other ownership parcels surrounded by NFS lands, unless it is found to be a public benefit.
FW-LANDSU-DC 1	Special use authorizations are responsive to demands for commercial or other use of NFS lands, while protecting sensitive ecological resources and maintaining multiple uses.
FW-LANDSU-DC 4	Vegetation within energy corridors allows for effective maintenance and operation of associated infrastructure, while retaining enough natural ecological characteristics to sustain wildlife and their habitats.
FW-LEASEMIN-DC 2	Reclamation of energy, mining, and mineral activity sites provides for public safety and the protection of forest resources and is conducted to return sites to a natural condition as nearly as possible.
FW-LEASEMIN-S 1	Bonds are collected for minerals operations requiring a plan of operation to insure appropriate closure for operations of all sizes.
FW-LEASEMIN-S 2	Surface uses in extractive mineral energy operations must be controlled through plans of operation and permits that provide for the long-term protection and sustainability of all affected resources.
FW-LEASEMIN-S 3	Lands within the 168,650-acre Geothermal Analysis Area in the Coyote, Cuba, Española, and Jemez Ranger Districts (figure 3) will not be leased for geothermal exploration or development.
FW-RENEWENERGY-DC 1	Exploration, development, production, and transmission of renewable energy resources contribute social and economic benefits to local communities and are conducted in a manner that minimizes adverse long-term impacts to forest resources and uses, ecosystem health, and watershed conditions.

Component Code	Plan Component
FW-MINERAL-DC 1	Energy, mineral, and mining activities meet the legal mandates to facilitate the development of minerals in a manner that minimizes adverse impacts to surface and groundwater resources, watershed and forest ecosystem health, wildlife and wildlife habitat, scenic character, and other desired conditions applicable to the area.
FW-MINERAL-DC 3	Appropriately remediated abandoned mines are available for roosting bats, reducing the potential for displacement, abandonment of young, and possible mortality.
FW-MINERAL-G 1	If, in the public interest, the responsible official should respond to requests for mineral materials through the NEPA process, advertised sale (if appropriate), and permit administration.
FW-MINERAL-S 3	Prior to the destruction of access to adits, shafts, and other mine workings, a biological inventory and assessment must be conducted to determine use by bats and other wildlife species. If determined to be used by wildlife, consider gating as an alternative to destruction.
FW-MINERAL-S 4	Mining activities should incorporate reclamation measures that reduce visual contrasts with the surrounding landscapes. Mitigation measures, including recontouring topography and revegetating bare sites where necessary, should be used to move areas impacted by mining activities toward the long-term scenic integrity objectives of that area.
FW-MINERAL-S 5	All mineral-related activities must include reclamation of surface resource impacts, whether or not a plan of operation is required
FW-MINERAL-S 7	Approval of mining activities must include the use of reclamation bonds to protect and restore surface resources.
FW-MINERAL-S 8	On site disturbances where radionuclides may exist, reclamation will address potential for radionuclide exposure to people and the environment. Readings for radionuclide levels will be taken after reclamation to ensure remediation to background levels or other level approved by the appropriate regulatory agency.

Component Code	Plan Component
FW-MINERAL-S-9	Plans of operation must include contingencies to address stabilization and interim reclamation of mineral sites during periods of unforeseen shutdown (e.g., as in 36 CFR 228.10). This contingency plan would apply any time mine activity ceases during development and production, and before planned closure.
FW-CAVES-DC 1	Caves provide habitat for species that require specialized conditions for roosting and overwintering, such as bats. Caves maintain moisture and temperature levels consistent with historic conditions. They do not contain bat diseases, such as white-nose syndrome.
FW-CAVES-DC 2	Significant cave aesthetic, cultural, and scientific values remain intact and are protected from damage to provide for uses by people (traditional cultural uses), wildlife, or both.
FW-CAVES-G 1	Geologic and physical features (e.g., talus slopes, cliffs, canyon slopes, or caves) should be protected from damage or loss to retain their importance for wildlife habitat and ecological functions.
FW-CAVES-S 1	Prior to physically closing caves to public entry, pre-closure inspections must be conducted to determine if cave-dependent or other species are present. Cave closures will only occur when it is the only viable option to protect cave resources. If a gate is utilized as part of the closure, it must allow free passage of bats, small animals, air, and water.
FW-CAVES-S 3	Recreational activities inside caves must only be promoted for designated recreational caves.
FW-SCENIC-DC 2	The forest appears predominantly natural and includes cultural landscapes valued by forest users and local communities for their scenic and traditional values.
FW-SCENIC-G 1	Constructed features, facilities, and management activities should blend with the natural-appearing landscape. The concepts of form, line, color, texture, and pattern common to the desired scenic character being viewed should be applied during project planning and design.

Component Code	Plan Component
DA-WILD-DC 1	<p>Designated wilderness areas exhibit wilderness character.</p> <ul style="list-style-type: none"> a Wilderness represents an environment that is essentially an unmodified and natural landscape. Constructed features exist only when they reflect the historic and cultural landscape, when they are the minimum necessary for administration of the area as wilderness, or for the protection of resources. b Natural processes (e.g., insects and disease and fires) function within their natural ecological role. c Wilderness provides recreation opportunities where social encounters are infrequent and occur only with individuals or small groups, so there are opportunities for solitude. Visitors experience self-reliance, challenge, and risk while enjoying freedom to pursue non-motorized or mechanized activities with only the regulation necessary to protect wilderness character.
DA-WILD-S 1	Group size limit shall be 15 persons and 15 recreational livestock per group, except as determined under special use permit, emergency services, formal agreements, and management activities for maintaining wilderness character.
DA-WILD-S 4	Outfitter-guide activities shall include appropriate wilderness practices, such as “leave no trace” principles, and incorporate awareness for wilderness values in their interaction with clients and others.
DA-IRA-DC 1	Inventoried roadless areas encompass large, relatively undisturbed landscapes that are important for biological diversity and the long-term survival of at-risk species. They serve as safeguards against the spread of invasive species and provide reference areas for study and research.
DA-IRA-DC 2	In inventoried roadless areas, ecosystems are intact and function to provide a full range of ecosystem services.
DA-IRA-G 1	Inventoried roadless areas should be managed for semi-primitive nonmotorized and semi-primitive motorized recreation settings as defined in the recreation opportunity spectrum.
DA-IRA-G 2	Management activities should be consistent with the scenic integrity objective of high in inventoried roadless areas as defined in the scenery management system.
MA-CANBON-S 1	No surface occupancy for minerals, geothermal, or oil and gas extraction shall be allowed.

Component Code	Plan Component
MA-CANBON-S 6	New roads must not be constructed, and closed roads shall not be opened.
MA-CANBON-S 8	New utility corridors must not be permitted or authorized.
MA-RECWILD-DC 1	<p>Recommended wilderness management areas maintain the wilderness characteristics they were evaluated to possess until their designation as wilderness or other use is determined by Congress.</p> <p>a Recommended wilderness management areas represent environments that are essentially unmodified and natural landscapes. Constructed features exist only when they reflect the historic and cultural landscape, when they are the minimum necessary for administration of the area as a recommended wilderness management area, or for the protection of resources.</p> <p>b Natural processes (e.g., insects and disease, blowdown, or fires) function within their natural ecological role or are mimicked (e.g., prescribed fire). Human caused fires other than prescribed fire, which are an unnatural occurrence, are suppressed.</p> <p>c Recommended wilderness management areas provide recreation opportunities where social encounters are infrequent and occur only with individuals or small groups, so there are opportunities for solitude. Visitors experience self-reliance, challenge, and risk while enjoying freedom to pursue non-motorized or non-mechanized activities with only the regulation necessary to protect wilderness characteristics.</p>
MA-RECWILD-G 2	<p>Intervention in natural processes through management activities should only occur where this would move the area toward desired conditions, preserve wilderness characteristics, protect public health and safety within and adjacent to the recommended wilderness management area, or uphold other Federal laws and regulations.</p> <p>a Unplanned and planned ignitions should be allowed to reduce the risks and consequences of uncharacteristic wildfire to increase apparent naturalness, or to enhance ecosystem function.</p>

Component Code	Plan Component
MA-RECWILD-S 1	<p>Natural processes shall be maintained within recommended wilderness management areas.</p> <ul style="list-style-type: none"> a Fires shall function in their natural ecological role. b Insect and disease infestations shall be allowed to run their natural course except where they unacceptably threaten wilderness characteristics. c Nonnative invasive species shall be treated using methods and in a manner consistent with wilderness characteristics, or in order to allow natural processes to occur in a recommended wilderness management area.
MA-RECWILD-S 2	<p>The following projects or activities shall not be authorized in recommended wilderness management areas.</p> <ul style="list-style-type: none"> a Constructing or designating new permanent or temporary roads, motorized trails, or mechanized (e.g., mountain bike) trails for public. b Commercial timber harvest. c Infrastructure related to special use permits for energy developments (e.g., wind, solar, electrical lines). d Sales or extraction of common variety minerals. e Motor vehicles, motorized equipment (e.g., chainsaws or wheelbarrows), and mechanical transport, with the following exceptions: <ul style="list-style-type: none"> i. unless specifically authorized for emergency use, ii. for management activities that move the area toward desired conditions while protecting existing wilderness characteristics over the long-term, or iii. for the limited needs required for authorized management of a grazing allotment or acequia access, which will not result in long-term degradation to wilderness characteristics. f Mechanized recreation.
MA-ELIGWSR- DC 1	<p>Eligible wild and scenic rivers retain their free-flowing condition and specific ORVs. Recommended preliminary classifications (wild, scenic, or recreational) remain in place until further study is conducted or until designation by Congress.</p>
MA-ELIGWSR-G 1	<p>New roads or motorized trails should not be constructed within one-quarter mile of a wild or scenic eligible river segment.</p>

Component Code	Plan Component
MA-ELIGWSR-G 2	Management activities should be consistent with the scenic integrity objectives of: a Very high in eligible wild rivers, b High in eligible scenic rivers, and c Moderate to high in eligible recreational rivers.
MA-ELIGWSR-G 3	Management activities should be consistent with the desired ROS classes of: a Primitive to semi-primitive non-motorized in eligible wild rivers, b Semi-primitive non-motorized to semi-primitive motorized in eligible scenic rivers, and c Semi-primitive to roaded natural in eligible recreational rivers.
MA-ELIGWSR-S 1	Eligible wild and scenic rivers must be managed to protect or enhance the ORVs for which they were determined to be eligible and to maintain their classification until they are designated or released from consideration. Eligible rivers found unsuitable for inclusion shall be released from further consideration and restrictions of this section.
MA-ELIGWSR-S 2	Any authorized water resources project in an eligible river segment must not adversely modify the river's free-flowing character.