



**Biological Evaluation**

For



**Santa Fe Mountains Landscape Resiliency Project**

**Espanola & Pecos-Las Vegas Ranger Districts  
Santa Fe National Forest  
Forest Service Southwestern Region  
United States Department of Agriculture  
Santa Fe & San Miguel Counties, New Mexico**

**2021.07.14**



Cover Photo- Sunlight on rain falling over the Project Area in the distance.

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## **INTRODUCTION**

The purpose of this Biological Evaluation (BE) is to analyze the proposed activities associated with the Santa Fe Mountains Landscape Resiliency Project (hereafter referred to as SFM Project or Project) to determine the impacts to Forest Service Region 3 Sensitive Species and whether the activities would lead toward federal listing under the Endangered Species Act of 1973, as amended. This BE conforms to the requirements in Forest Service Manual Direction (FSM 2672.42). Additionally, discussion of project effects to Management Indicator Species (MIS) and Migratory Birds are included in this document.

## **SPECIES EVALUATED AND THEIR LEGAL STATUS**

The sensitive species analyzed in this document are derived from the U.S. Forest Service Region 3 Regional Forester's Sensitive Species lists, 2013. Table 1 displays sensitive species that have potential or are known to occur on the Santa Fe National Forest and their effects determinations. Species were eliminated from evaluation based upon- lack of potential habitat, project or Analysis Area (AA) not included in historic or current range, or species extirpated without current feasibility for reintroduction. Geospatial Information System (GIS) data, housed and regularly updated at the Forest level, were used to identify observations of species, designated boundaries, vegetation and habitats.

## **BACKGROUND AND PURPOSE FOR THE PROJECT**

“The Santa Fe Mountains Landscape Resiliency (SFMLR) Project (Project) is a vegetation management project spanning approximately 50,566 acres proposed by the U.S. Forest Service Española and Pecos-Las Vegas Ranger Districts. The purpose of the Project is to improve the ecosystem resilience of a priority landscape to future disturbances including wildfire, climate change, and insect outbreaks. To meet this purpose, the U.S. Forest Service proposes mechanical and manual vegetation thinning treatments, use of prescribed fire, and riparian restoration on National Forest System lands within the project area. The Project also includes road closure on up to 1.5 mile of National Forest System roads. Initial forest... treatments would be conducted over... 10 to 15 years [post-project decision]” and would be followed by maintenance burning as needed. (Draft EA, USDA 2021)

For discussion about specific project purposes and needs, see the Project EA (USDA 2021).

Table 1 – USFS R3 2013 Regional Forester’s Sensitive Species In/Near the Project Area

Scientific Name (35)	Common Name	Species Known to Occur	Potential Suitable Habitat Present	Determination for Proposed Action*	Habitat and Proposed Project Impact (Alternative 2) (Project Impact Discussion in <b>Bold</b> )
<b>Mammals (10)</b>					
<i>Lynx Canadensis</i>	Canada Lynx	No	No	NI	Species is not known to occur historically. Reintroductions in 1999 in Colorado have resulted in lynx traveling through northern NM. Generally occurs in boreal and montane regions dominated by coniferous or mixed forest with thick undergrowth, but also sometimes enters open forest, rocky areas, and tundra to forage for abundant prey. Generally secretive. <b>Not known in or surrounding the area. The project area elevation is lower than typical habitat for this species, although they could pass through the area, it is anticipated that they would not remain residents in the area. No Further Analysis.</b>
<i>Martes americana origenes</i>	American Marten	No	Yes	MIH	Prefers late successional stands of mesic, conifer-dominated forest (mature old-growth spruce-fir with more than 30% canopy cover, abundant fallen logs and stumps, and lush shrub and forb vegetation to support prey species; mice, voles, insects, red squirrels, and snowshoe hare). Also feeds on carrion, berries, birds and bird eggs. Occurs between 7,000 to 13,000 feet, but mostly above 9,000 feet. <b>Most of project area at lower end of elevational range. Observations are limited to higher elevations outside of the project area. However, there is about 8,000 acres of potentially suitable habitat, largely in the Spruce-Fir where treatments are not proposed. Mature spruce-fir is not proposed for treatment thus would maintain potential suitable habitat. Additional habitat would be maintained in leave-islands and areas that are likely to receive no thinning, such as steep slopes over 60%, and areas that would only receive hand-thinning, such as slopes over 40%. Marten migrate elevationally, using the higher elevations in summer, descending in winter when snow is present enough to restrict their predators. Leave-islands and untreated areas would provide martens with habitat if they use the project area during the winter. With no marten observations and potential habitat to remain after the project, the species would not be impacted. Additionally, to help facilitate seasonal use, consideration would be taken to strategically arrange leave-islands to maintain potential elevational migrations. No Further Analysis.</b>
<i>Euderma maculatum</i>	Spotted bat	No	Yes	NI	Uses a variety of habitats including riparian, piñon-juniper, ponderosa pine, mixed conifer and spruce-fir forest. It is suggested that they summer in ponderosa pine, then move to lower elevations in late summer and autumn. Occurs between 3,900 and 10,600' in NM. Cliff dwellers with

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					diurnal roosts in cracks and crevices in rock. Diet consists predominantly of moths, but also includes katydids, grasshoppers, and flies. <b>Not known in or surrounding the area. Project is at the upper end of its range and includes only about 960 acres of potentially suitable habitat. Cliffs and rock crevices are not common in the area. Even if available, these features would not be altered by the project. Treatments likely to improve understory vegetation, thus maintain or improve prey (insect) abundance. No Further Analysis.</b>
<i>Corynorhinus townsendii pallescens</i>	Pale Townsend's big-eared bat	No	Yes	MIIH	Uses semi desert shrublands, piñon-juniper woodlands, and open montane forests, including spruce-fir. Uses caves and abandoned mines for day roosts and hibernacula. Also uses abandoned buildings and crevices on rock cliffs for refuge. Maternity sites include trees, caves or man-made structures. Night roosts include caves, open buildings, rock shelters, and cement culverts beneath roads, bridges and mines. Diet consist of greater than 90% moths. <b>Not known in or surrounding the area. About 8700 acres of potentially suitable habitat exists, mostly in the pinyon-juniper areas. Project would not alter the habitat except for the possibility that a maternity nest tree could be cut if in the project area, however this risk is low considering that larger trees and snags are not to be cut unless posing a direct safety issue. Treatments likely to improve understory vegetation, thus maintain or improve prey (insect) abundance. Project would maintain and promote openings which bats use for foraging. No Further Analysis.</b>
<i>Cynomys gunnisoni gunnisoni</i>	Gunnison's prairie dog (prairie and montane populations)	No	Yes	NI	Found in montane grassland, juniper savanna, plains-mesa grassland, Great Basin desert scrub, plains-mesa and scrub, desert grassland vegetation. <b>Not known in or surrounding the area. Project area only provides about 714 acres of potentially suitable habitat. No Further Analysis.</b>
<i>Sorex cinereus</i>	Cinereus (Masked) Shrew	No	Yes	MIIH	Confined primarily to riparian habitats in sub-alpine coniferous forest in the Sangre de Cristo, Jemez and San Juan Mountains, usually above 9,500'. It has been found along the banks of cold streams, in springy meadows, or under logs in the cold spruce woods. <b>Project is partially within the lowest extent of the range. Approx. 9826 acres of potentially suitable habitat occurs in the project area. Treatments would largely be below its range and outside of the spruce and sub-alpine ERUs. Very few cold streams occur in the project area. Where treatments occur along streams, they would be</b>

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					<b>implemented as designed to improve riparian and water quality. Logs would be retained at sufficient quantities to continue providing suitable habitat. No Further Analysis.</b>
<i>Sorex palustris</i>	American Water Shrew	No	Yes	MIIH	Water shrews are confined to the Sangre de Cristo, San Juan and Jemez Mountains. They occur near permanent streams, seldom descending below 8,000' in altitude. Eats large quantities of invertebrates on a daily basis such as aquatic organisms, earthworms and spiders. <b>The project area is within the elevation range, however there are very few permanent streams in the project area. Only about 960 acres of potentially suitable habitat occurs in the project area. Where treatments occur along streams, they would be implemented as designed to improve riparian and water quality. Treatments likely to improve understory vegetation, thus maintain or improve prey (insect) abundance. No Further Analysis.</b>
<i>Sorex preblei</i>	Preble's Shrew	No	Yes	MIIH	Found near permanent or intermittent streams in arid to semi-arid shrub or grasslands and to a lesser extent dense high-elevation coniferous forests. In general, their habitat is confined to riparian or riparian like (springs, seeps, etc.) conditions. Probably forages on small, soft-bodied invertebrates found in riparian areas. Elevational range is approximately 1,280-2,550 meters. Known in Sandoval County, NM. <b>Project is within the upper elevational range for this species, however there are very few permanent streams in the project area. Only about 960 acres of potentially suitable habitat occurs in the project area. Where treatments occur along streams, they would be implemented as designed to improve riparian and water quality. Treatments likely to improve understory vegetation, thus maintain or improve prey (insect) abundance. No Further Analysis.</b>
<i>Ochotona princeps nigrescens</i>	Goat Peak Pika	No	No	NI	Restricted to the Jemez Mountains. Restricted to rocky talus slopes, primarily the talus-meadow interface (Smith and Weston 1990, Nature Serve 2006), often above tree line in alpine and subalpine areas (BISON-M 2006). Feeds primarily on grasses and sedges; but also eat some flowering plants and roots of woody vegetation in the summer (Nature Serve 2006). <b>Not known in or surrounding the area. Project area is not above tree line and is not in the Jemez Mountains. No Further Analysis.</b>

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<i>Ochotona princeps saxatilis</i>	American Pika	No	Yes	MIIH	Restricted to rocky talus slopes, primarily the talus-meadow interface (Smith and Weston 1990, Nature Serve), often above tree line in alpine and subalpine areas (BISON-M 2006). As low as 11,000 ft. in elevation in New Mexico. Feeds primarily on grasses and sedges; but also eat some flowering plants and roots of woody vegetation in the summer (Nature Serve). <b>Project treatments are not proposed above tree line or in talus-meadow habitat. About 2571 acres of potential habitat exists in the project area but is outside of the treatment areas. Treatments would improve understory vegetation, such as grasses, which are important for this species. No Further Analysis.</b>
<b>Birds (7)</b>					
<i>Accipiter gentilis</i>	Northern goshawk	No	Yes	MIIH	Forested areas with moderate space between trees (for foraging) such as ponderosa pine, aspen, white and Douglas fir. Canopy cover generally over 40%, nesting areas usually higher canopy cover. <b>Habitat exists in the project area, and goshawks are known in the area. Project treatments would alter habitat for goshawks, primarily short-term with potential long-term benefits. See discussion below for further analysis.</b>
<i>Falco peregrinus anatum</i>	American peregrine falcon	No	No	NI	Various open habitats from grassland to forested in association with suitable nesting cliffs (NatureServe). In New Mexico, the breeding territories of peregrine falcons center on cliffs that are in wooded/forest habitats, adjacent to large expanse of area for foraging (BISON-M 2008). In New Mexico, jays, woodpeckers, swifts, mourning doves and pigeons are commonly taken as prey species (BISON-M 2008). <b>Project area lacks suitable habitat; cliffs for nesting. Species known to occur adjacent to the project, Falcon Zone D is in the analysis area (AA), however the eyrie is not. Species may pass through the area and forage, however prey would still be available in and around the area. Treatments may improve habitat diversity and thus improve prey base populations. No Further Analysis.</b>
<i>Haliaeetus leucocephalus</i>	Bald eagle	No	No	NI	Nests in tall trees and commonly near bodies of water where fish and waterfowl prey are available; use conifer forests and cottonwood riparian areas. <b>Not known in or surrounding the area. Project area lacks suitable habitat; bodies of water with fish or waterfowl. Reservoirs exist in the AA, however, not close enough for nesting to occur in the project area. Large snags would not be cut. Treatments would not</b>



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					<b>negatively impact water quality or would improve water quality, thus not negatively impact fish populations downstream of the project area. Treatments are also designed to minimize the risk of wildfire, which also reduced the risk of post-fire effects such as high levels of sediment transport downstream. No Further Analysis.</b>
<i>Athene cunicularia hypugaea</i>	Western Burrowing Owl	No	No	NI	In New Mexico, burrowing owls inhabit grasslands, open shrubland and woodland at lower to middle elevations (2800 – 7,500 ft). <b>Not known in or surrounding the area. Project is above the elevational range and does not contain suitable habitat. No Further Analysis.</b>
<i>Aegolius funereus</i>	Boreal Owl	No	Yes	NI	The boreal owl occurs mainly above 9,500’ in spruce-fir forests. Surveys through 1996 showed this species to be resident in very small numbers in spruce-fir and similar habitat in the Jemez mountains. In the Rockies, they generally occur in mature, multilayered spruce-fir forest. They roost in dense cover by day, in cool micro sites in summer, frequently changing roost site. Nests are in tree holes, natural cavities or old woodpecker holes, sometimes in artificial nest boxes. Nest site may be used in consecutive years. Tree nest holes in Colorado were 3-4 inches in diameter (NatureServe). <b>Not known in or surrounding the area. Though the project area contains about 4832 acres of potential habitat, MSO Surveys documented other owls, but did not observe this species. Project is partially within the lowest extent of the elevational range. However, treatments are not proposed in the spruce-fir habitat. Project is not in the Jemez mountains. No Further Analysis.</b>
<i>Lagopus leucura</i>	White-tailed Ptarmigan	No	Yes	NI	Primarily inhabits alpine ecosystem at or above tree line, generally above 3,200 meters (10,500 ft.) in New Mexico (Braun et al 1993, Hoffman 2006 and BISON-M 2006) but will descend to lower elevations (2,400 meters or 7,875 ft.) below the tree line during heavy snow years. The presence of willow and the availability of snow-free areas are considered the two most important factors influencing where ptarmigan breed habitat (Hoffman 2006). Primarily feeds on buds, stems and seed in the winter and buds, leaves, stems, seeds, fruit, flowers, and insects in the summer (Braun et al 1993, Hoffman 2006, BISON-M 2006, and NatureServe 2007). In 1981, the New Mexico Department of Game and Fish, transplanted 43 birds into the Truchas Peak area of the Pecos Wilderness (BISON-M 2006). Since that time, the white-tailed ptarmigan has been occasionally documented in the Pecos Wilderness.

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					<b>Not known in or surrounding the area. Project area is mostly below the usual elevation range, not above tree line and is outside of the wilderness area. Though there are about 4649 acres of potential habitat, this occurs in or above the spruce-fir habitat that would not be treated. No Further Analysis.</b>
<i>Vireo vicinior</i>	Gray vireo	No	Yes	NI	<p>Scrub-foraging inhabitant of some of the hottest, most arid regions. Found at elevations from 5,500-7,200 feet in broad-bottomed canyons (flat or gently sloped valleys), below or near ridge-top/rock outcrop/cliff head wall of canyon, or gently sloped bowls in canyon-juniper woodlands (NatureServe and NMDGF 2006). The vireo is most often associated with juniper trees (<i>Juniperus</i> spp.), piñon pine (<i>Pinus edulis</i>), or oak (<i>Quercus</i> spp.) with a wide variety of shrubs and grasses (NMDGF 2006 and NMDGF 2007). Habitat usually contains a mixture of open savannas and slightly more closed-canopy woodland areas (NatureServe and NMDGF 2006). Insectivorous; takes grasshopper, stinkbugs, treehoppers, crickets, moths, damselflies, cicadas, and caterpillars (Barlow et al 2006 and NMDGF 2007). Takes most prey from leaves, twigs, branches and trunks of small trees or twigs and branches of shrubby vegetation (Barlow et al 2006 and NMDGF 2007).</p> <p><b>Project is largely above the elevational range. Only about 480 acres of potentially suitable habitat occurs in the project area. Treatments are likely to increase understory vegetation, thus improve species prey items. Leave-islands and thinned areas would provide a diversity of open and closed canopy forests (See IDFs). No Further Analysis.</b></p>
<b>Amphibians (1)</b>					
<i>Lithobates pipiens</i>	Northern Leopard Frog	No	Yes	MIIH	<p>Uses wide variety of habitats (springs, marshes, wet meadows, riparian areas, vegetated irrigation canals, ponds, and reservoirs) but require a high degree of vegetative cover for concealment (NatureServe and BISON-M). In New Mexico they are known from about 3,600-10,000 feet and breed in ponds or lake edges with fairly, dense aquatic emergent vegetation from April-July and September-October (Degenhardt et al 1996). Over-wintering habitats are larger lakes and streams that do not freeze completely during winter (NatureServe).</p> <p><b>Not known in or surrounding the area. There are very few permanent water features, such as streams, springs and wet meadows, with no ponds. About 700 acres of potential habitat is within the project area. Reservoirs exist in the AA. Water features that do exist have minimal</b></p>

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					<p>vegetative cover. Where treatments occur along streams, they would be implemented to improve riparian vegetation and water quality. Treatments likely to improve understory vegetation, thus maintain or improve prey (insect) abundance. Treatments would maintain or improve water quality, thus no negative impact waters downstream of the project area are expected. Treatments are also designed to minimize the risk of wildfire, which also reduces the risk of post-fire effects such as high levels of sediment transport downstream. <b>No Further Analysis.</b></p>
<b>Fish (3)</b>					
<i>Gila pandora</i>	Rio Grande chub	No	No	NI	<p>Generally found in streams less than 2% gradient in low velocity habitats such as pools, runs, and glides. Often linked with instream woody debris or aquatic vegetation. Mid-water feeders that feed on insects, zooplankton, and small fish. Inhabits small to moderate-sized streams, but also occurs in impoundments.</p> <p><b>Not known in or surrounding the area. Occupied habitat exists over 13 miles downstream of the project area, on non-FS land, downstream of Santa Fe. Project area has very little perennial water. Treatments are designed to protect and improve water quality. Treatments are also designed to minimize the risk of wildfire, which also reduces the risk of post-fire effects such as high levels of sediment transport downstream. No negative impacts are expected when considering the long distance of the project from the occupied habitat, combined with the potential benefits. No Further Analysis.</b></p>
<i>Oncorhynchus clarki virginalis</i>	Rio Grande cutthroat trout	No	No	NI	<p>Feeds opportunistically on aquatic and terrestrial invertebrates, mainly which are found in stream drift. Spawns typically from the middle of May to the middle of June. Sediment-free depositional gravel beds that have a continuous flow of well-oxygenated water are required for successful development of embryos. Suitable gravels range from 6-40 mm in diameter (Magee et al. 1996, Harig and Fausch 1999). Juveniles need shallow calm water that is protected from the elements provided by Side channels, undercut banks and overhanging vegetation or exposed roots along margins. Adults need pools with greater than 1 foot in residual depth in order to survive harsh winter conditions (Harig and Fausch 2000).</p> <p><b>An occupied stream is within the AA, however it is within a different watershed, therefore downstream impacts from project actions would not reach the occupied stream. Project area has very little</b></p>

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					<p>perennial water. Waters that do exist are generally shallow, lacking the depth for overwintering and lack side channels needed for young. Treatments are designed to protect and improve water quality. No negative impacts are expected. Treatments are also designed to minimize the risk of wildfire, which also reduces the risk of post-fire effects such as high levels of sediment transport downstream. <b>No Further Analysis.</b></p>
<i>Catostomus plebeius</i>	Rio Grande sucker	No	No	NI	<p>Typically occur in middle elevations (6,600-8,600 feet) of small to large streams (i.e., creeks to medium rivers). Favors low to moderate gradient riffles and pools below riffles in low velocity stream reaches. Usually found over gravel and /or cobble, but can also be in backwaters. Prefers clear-water streams where periphyton is common. Rarely found in waters with heavy loads of silt and organic detritus. On Santa Fe NF, Rio Grande sucker have been found in low gradient (&lt;3.2%) stream reaches at elevations from 5,600 – 9,600 feet. Juveniles and adults both preferred glides and pools with mean water column velocities &lt;20cm/s.</p> <p><b>Not known in or surrounding the area. Occupied habitat exists over 13 miles downstream of the project area, on non-FS land, downstream of Santa Fe. Project area has very little perennial water. Treatments are designed to protect and improve water quality. Treatments are also designed to minimize the risk of wildfire, which also reduces the risk of post-fire effects such as high levels of sediment transport downstream. No negative impacts are expected when considering the potential benefits, combined with the long distance of the project from the occupied habitat. No Further Analysis.</b></p>
<b>Clams (1)</b>					
<i>Pisidium lilljeborgi</i>	Lilljeborg Peaclam	No	No	NI	<p>Found in lakes, occurring at higher latitudes and altitudes. The New Mexico population of the species occurs in cold, alpine Nambe Lake, which is located in a glacial cirque about 11,300 feet in elevation. The surrounding habitat includes rocky talus, stands of Engelmann spruce and subalpine fir, and grass-sedge-forb communities.</p> <p><b>Occupied lake (Nambe Lake) occurs within the AA, however it is within a different watershed, therefore downstream impacts from project actions would not reach the occupied lake. Project area has minimal perennial water and no lakes. Treatments are designed to minimize the risk of wildfire in and adjacent to the project area, and</b></p>

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					<b>also reduces the risk of post-fire effects such as high levels of sediment transport downstream. No Further Analysis.</b>
<b>Snails (1)</b>					
<i>Gastrocopta ruidosensis</i>	Ruidoso Snaggletooth	No	No	NI	Found on bare soil, under stones and in thin accumulations of grass thatch and juniper litter on mid-elevation carbonate cliffs and xeric limestone grasslands along the eastern slopes of the Sangre de Cristo and Sacramento mountains in eastern New Mexico (Nekola and Coles, 2010) (NatureServe). <b>Not known in or surrounding the area. Project does not include the eastern slopes of the Sangre de Cristo mountains. Additionally, habitats of bare soil, stones, grass thatch and juniper litter would persist across the area post-treatment. No Further Analysis.</b>
<b>Plants (12)</b>					
<i>Lilium philadelphicum</i>	Wood lily	No	Yes	MIH	Soils are humus rich and well-drained. Little is known about habitat characteristic of the species (NMRPTC). Likely occurs in the understory of mixed-conifer forests out of direct sunlight. Wooded sites in foothills in montane-subalpine habitats. <b>Wood lily is not known in or surrounding the area, however, about 663 acres of potential habitat exists in the project area. If discovered, proper protection measures would be developed such as avoidance (See IDFs). If it exists in the project area and goes undetected, some, but likely not all, individuals could be impacted during thinning, piling or burning depending on the season. Mechanical treatments may trample individuals, however such treatments would be limited in spatial extent. Fall and winter treatments reduce risks. Diversity of habitats following treatments would maintain available habitat. Treatments would reduce the risk of catastrophic wildfire that could negatively impact the species on a large scale. The potential for negative and beneficial impacts is immeasurable, likely slight, and likely offset through project IDFs and benefits of fires risk reduction. No further analysis.</b>
<i>Mentzelia springeri</i>	Springer’s Blazing Star	No	No	NI	Occurs in volcanic pumice and unconsolidated pyroclastic ash in piñon-juniper woodland and lower montane coniferous forests from 7,000 – 8,000 feet in elevation (NMRPTC). This species is narrowly endemic to loose volcanic substrate of the Jemez Mtns and is often seen where roads cut through pumice. Has not been documented on the Santa Fe NF.

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					<b>Not known in or surrounding the area and is unlikely. Project is largely above the elevational range and is not in the Jemez Mtns. No Further Analysis.</b>
<i>Erigeron subglaber</i>	Pecos fleabane	No	No	NI	Habitat is rocky, open meadows in subalpine coniferous forest; 10,000-11,500 feet in elevation (NMRPTC 1999 and NatureServe 2006). <b>Not known in or surrounding the area. Project is largely below the elevational range, not in subalpine forests with open meadows. Spruce-fir and sub-alpine ERUs would not be treated. No Further Analysis.</b>
<i>Calochortus gunnisonii</i> var. <i>perpulcher</i>	Pecos Mariposa Lily	No	Yes	MIIH	Habitat consists of meadows and aspen glades in upper montane coniferous forest from 9,500-11,200 feet in elevation. Was known on Hermit’s Peak, but attempts to relocate the species have been unsuccessful. The lily is suspected only on the Pecos-Las Vegas Ranger District. <b>Not known in or surrounding the area, however about 2,028 acres of potential habitat exists in the project area. The project area largely lacks meadows or aspen glades. Aspen occur but not in treatment areas in quantities large enough to constitute a glade. Project is not at or near Hermit Peak. However, if discovered, proper protection measures would be developed such as avoidance (See IDFs). If it exists in the project area and goes undetected, some, but likely not all, individuals could be impacted during thinning, piling or burning depending on the season. Mechanical treatments may trample individuals, however such treatments would be limited in spatial extent, only on slopes less than 40%, where needed and feasible, and not usually in meadows and aspen glades. Fall and winter treatments are the preference which would further reduce potential risks for damage to individuals. Diversity of habitats following treatments would maintain available habitat. Treatments would reduce the risk of catastrophic wildfire that could negatively impact the species on a large scale. The potential for negative and beneficial impacts is immeasurable, likely slight, and likely offset through project IDFs and benefits of fires risk reduction. No Further Analysis.</b>
<i>Asclepias uncialis</i>	Greene milkweed	No	Yes	MIIH	Occurs in upland of grasslands. Primarily associated with species typical of shortgrass prairie. Associated vegetation is comprised mostly of grasses (grama), with forbs, and shrubs; with trees (juniper), typically comprising less than 15% of the total vegetation cover (NatureServe and

**Table 1 – USFS R3 2013 Regional Forester’s Sensitive Species In/Near the Project Area**

Scientific Name (35)	Common Name	Species Known to Occur	Potential Suitable Habitat Present	Determination for Proposed Action*	Habitat and Proposed Project Impact (Alternative 2) (Project Impact Discussion in <b>Bold</b> )
					<p>Decker 2006). Plants are found on plains, open hills, or low slopes. Typically, they are found growing in open spaces (base soil) between bunch grasses on soils that are dry and warm.</p> <p><b>Not known in or surrounding the area. Project only includes about 154 acres of potential habitat. The treatments would promote more open conditions in some areas, potentially improving habitat for this species. If discovered, proper protection measures would be developed such as avoidance. If it exists in the project area and goes undetected, some, but likely not all, individuals could be impacted during thinning, piling or burning depending on the season. Mechanical treatments may trample individuals, however such treatments would be limited in spatial extent. Fall and winter treatments are the preference which would further reduce potential risks for damage to individuals. Diversity of habitats following treatments would maintain available habitat. Treatments would reduce the risk of catastrophic wildfire that could negatively impact the species on a large scale. The potential for negative and beneficial impacts is immeasurable, likely slight, and likely offset through project IDFs and benefits of fires risk reduction. No Further Analysis.</b></p>
<p><i>Cypripedium parviflorum</i> var. <i>pubescens</i> (= <i>C. calceolus</i> var. <i>pubescens</i>, <i>C. pubescens</i>)</p>	<p>Yellow lady's-slipper</p>	<p>No</p>	<p>Yes</p>	<p>MIIH</p>	<p>Moderate shade to nearly full sun in fir, pine and aspen forests from 6,000 to 9,500 feet in elevation (Mergen 2006 and Coleman 2002). It most often grows just above the banks of streams and seeps, usually within 150-300 feet from water.</p> <p><b>Not known in or surrounding the area, however, about 1057 acres of potential habitat occurs in the project area. Project area has few perennial streams and seeps. If treatments occur along streams, they would be implemented as designed to improve riparian and water quality. Treatments are likely to improve understory vegetation, thus maintain or improve habitat for this species. If discovered, proper protection measures would be developed such as avoidance. If it exists in the project area and goes undetected, some, but likely not all, individuals could be impacted during thinning, piling or burning depending on the season. Mechanical treatments may trample individuals, however such treatments would be limited in spatial extent. Fall and winter treatments are the preference which would further reduce potential risks for damage to individuals. Diversity of habitats following treatments would</b></p>

Table 1 – USFS R3 2013 Regional Forester’s Sensitive Species In/Near the Project Area

Scientific Name (35)	Common Name	Species Known to Occur	Potential Suitable Habitat Present	Determination for Proposed Action*	Habitat and Proposed Project Impact (Alternative 2) (Project Impact Discussion in <b>Bold</b> )
					<b>maintain available habitat. Treatments would reduce the risk of catastrophic wildfire that could negatively impact the species on a large scale. The potential for negative and beneficial impacts is immeasurable, likely slight, and likely offset through project IDFs and benefits of fires risk reduction. No Further Analysis.</b>
<i>Astragalus micromerius</i>	Chaco milkvetch	No	No	NI	Usually associated with outcrops of sandstone that is blended with Todilto gypsum or limestone. Occurs on gypseous or limy sandstones in piñon-juniper woodland or Great Basin desert scrub; 6,600-7,300 feet in elevation (NatureServe). Limited to the west side of the SFNF; Coyote and Cuba Ranger Districts. <b>Not known in or surrounding the area, unlikely to occur. Project is outside of the elevational and spatial range. No Further Analysis.</b>
<i>Abronia bigelovii</i>	Tufted Sand Verbena	No	No	NI	Habitat for the verbena consists of hills and ridges of gypsum in the Todilto formation, from 5,700-7,400 feet in elevation (NatureServe and NMRPTC 1999). Populations are usually small and are restricted to gypsum or strongly gypseous soil derived from gypsum outcrops (NMRPTC 1999). Plants are conspicuous on the otherwise rather barren gypsum. On the Santa Fe NF, the tufted sand verbena is suspected on the Cuba and Coyote Ranger Districts. <b>Not known in or surrounding the area, unlikely to occur. Project is outside of the spatial range and only slightly in the elevational range. No Further Analysis.</b>
<i>Delphinium robustum</i>	Robust Larkspur	No	Yes	MIIH	Canyon bottoms and aspen groves in lower and upper montane coniferous forest; 2,200-3,400 m (7,200-11,200 ft.). <b>Little is known about this species, however, it has not been observed in or surrounding the project area. About 2776 acres of potential habitat occurs in the project area, if discovered, proper protection measures would be developed. If it exists in the project area and goes undetected, some, but likely not all, individuals could be impacted during thinning, piling or burning depending on the season. Mechanical treatments may trample individuals, however such treatments would be limited in spatial extent. Fall and winter treatments are the preference which would further reduce potential risks for damage to individuals. Diversity of habitats following treatments would maintain available habitat. Treatments would reduce the risk of catastrophic wildfire that could negatively impact the species on a large scale. The potential for negative and beneficial impacts is immeasurable, likely slight, and likely offset</b>



Table 1 – USFS R3 2013 Regional Forester’s Sensitive Species In/Near the Project Area

Scientific Name (35)	Common Name	Species Known to Occur	Potential Suitable Habitat Present	Determination for Proposed Action*	Habitat and Proposed Project Impact (Alternative 2) (Project Impact Discussion in <b>Bold</b> )
					<b>through project IDFs and benefits of fires risk reduction. No Further Analysis.</b>
<i>Draba heilii</i>	Heil’s Alpine Whitlowgrass	No	No	NI	Alpine tundra growing in association with other low, caespitose or pulvinate alpine plants; about 3,690 m (12,100 ft). Vicinity of Truchas and Santa Barbara peaks in the Pecos Wilderness. It appears to be a very narrow endemic. (NMRPTC) <b>Not known in or surrounding the area and is unlikely to occur. Project is almost completely outside of the elevational range and treatments would not occur in the upper elevations nor in alpine tundra. Project lacks alpine tundra habitat. No Further Analysis.</b>
<i>Mentzelia conspicua</i>	Chama Blazing Star	No	No	NI	Specimens recorded in Chama Canyon and Ghost Ranch on sandstone formations. Narrow endemic of the upper Chama River valley where it grows in specialized habitat of gray to red shale and clays of the Mancos and Chinle formations (NatureServe and NMRPTC). On the Santa Fe NF, on the Coyote and Cuba Ranger Districts. <b>Not known in or surrounding the area and is unlikely. Project does not occur where this species is known. No Further Analysis.</b>
<i>Salix arizonica</i>	Arizona Willow	No	Yes	NI	Associated with sedge meadows and wet drainages in subalpine coniferous forest from 10,000 – 11,200 feet in elevation. Occurs as a narrow, linear strip associated with perennial water in seeps, springs, streams sides and wet meadows. Sometimes found in drier sites adjacent to forest edges or within the riparian zone where subsurface channels provide moisture. Frequently associated with substrates of volcanic origin, and it appears to favor coarse-texture and well-watered soils, including those associated with alluvial deposits. <b>Not known in or surrounding the area. Project is largely below the elevational range and has few perennial water features. However, about 213 acres of potential habitat occurs in the project area. However, the potential habitat is at higher elevations and in the spruce-fir areas where treatments are not proposed. If treatments occur along streams, they would be implemented as designed to improve riparian and water quality. Treatments are likely to improve riparian vegetation, thus maintain or improve habitat for this species. Treatments are designed to minimize the risk of wildfire spread in and adjacent to the project area, thus reducing the potential risk to this species from high-severity wildfire. No Further Analysis.</b>

**Table 1 – USFS R3 2013 Regional Forester’s Sensitive Species In/Near the Project Area**

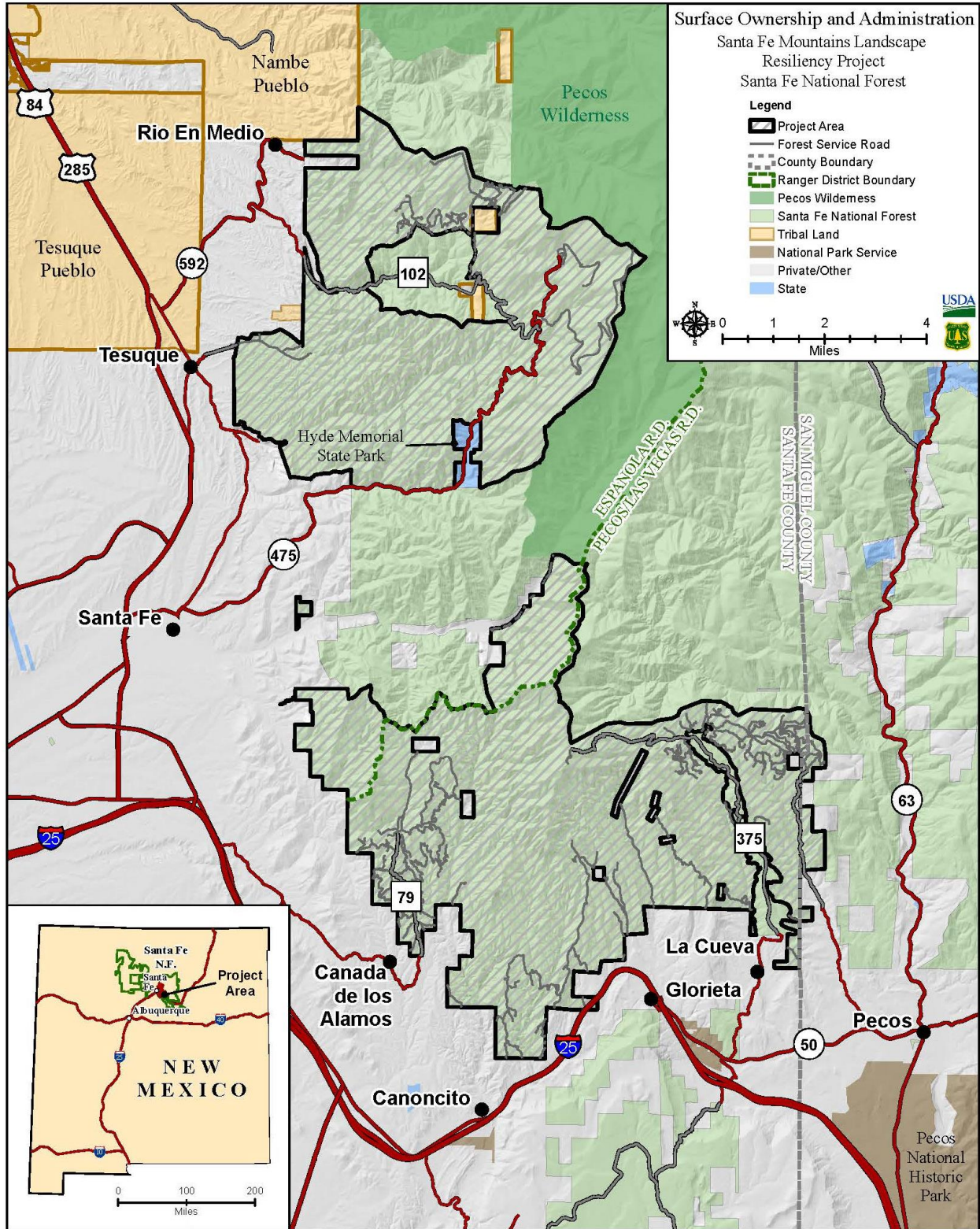
Scientific Name (35)	Common Name	Species Known to Occur	Potential Suitable Habitat Present	Determination for Proposed Action*	Habitat and Proposed Project Impact (Alternative 2) (Project Impact Discussion in <b>Bold</b> )
<p><u>*Determination for Proposed Action:</u>  <b>NI</b> = No Impact to populations, species or habitat. No further analysis.  <b>MIH</b> = May Impact Individuals or Habitat but is not likely contribute to a trend towards Federal listing or loss of viability to the populations or species.  <i>Note:</i> There is insufficient information to make a definitive ruling for some species such as some of the plants and invertebrates.</p> <p><b>Important Note-</b> Determinations have been made based on the numerous factors, such as the presence or absence of suitable habitat. For species that may occur in the project area, determinations were dependent upon the understanding that the project’s Integrated Design Features (IDFs) would be implemented, which leads to a lower effects determination by minimizing the potential for adverse direct and indirect impacts.</p>					

## PROJECT LOCATION

The project area is located on the Espanola and Pecos-Las Vegas Ranger Districts of the Santa Fe National Forest in Santa Fe and San Miguel Counties in northeastern New Mexico. (See Figure 1 - Map). The project is within elevations approximately between 6,900 and 12,400 feet (2,100 – 3,780 meters).

The legal descriptions of the project area is:

- Township (T) 16 North (N), Range (R) 10 East (E), Sections 1-4, 10-15, 23-25
- T 16 N, R 11 E, Sections 1–21, 24-25, 29-31
- T 16 N, R 12 E, Sections 6-7, 18-19
- T 17 N, R 10 E, Sections 1–5, 20–21, 24-29, 32-36
- T 17 N, R 11 E, Sections 6-8, 17-20, 25-27, 29-36
- T 17 N, R 12 E, Sections 30-31
- T 18 N, R 10 E, Sections 1–4, 9–13, 15-16, 19-36
- T 18 N, R 11 E, Sections 5-10, 16-21, 28-32
- T 19 S, R 10 E, Section 34



The data used to create this map is intended for broad-scale planning purposes. The Forest Service provides no warranty regarding its accuracy or use for other purposes.  
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Figure 1 – Santa Fe Mountains Landscape Resiliency Project Vicinity Map (USDA 2020)

## EXISTING CONDITION

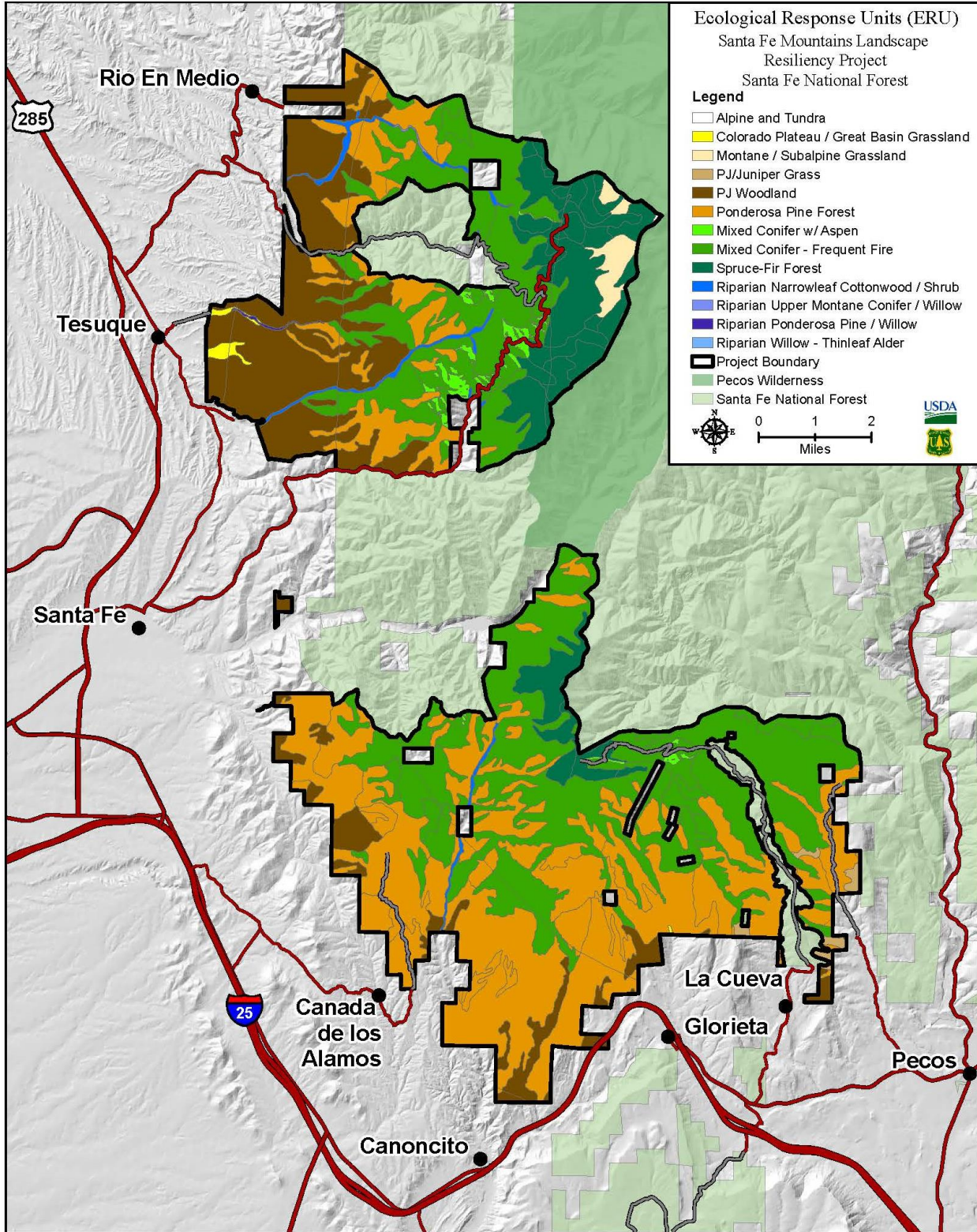
For discussion about specific project existing and desired conditions, see the Project EA (USDA 2020). In summary, the project area is dominated by tree stands (ponderosa, mixed conifer, spruce-fir, pinyon-juniper and riparian) increasing in density over time. The majority of these trees are small diameter in the understory, often growing in shade, thus stunted and at risk for disease. The absence of low-intensity fire has promoted this in-fill of small trees and has contributed to the accumulation of surface fuel loads in the project area. The combination of the dense vegetation, high fuel loads, and presence of ladder fuels results in an increased risk for uncharacteristically severe wildfire which could drastically alter vegetation communities and thus wildlife habitats. In addition, the high vegetation densities have increased the risk of insect and disease outbreaks which, when coupled with drought stress can lead to widespread tree mortality, again risking habitat alteration.

The vegetation within and immediately adjacent to the project area also consists of a diversity of other types and conditions. These include mixed conifer and aspen overstory types and understory types of upland vegetation such as grasses and small shrubs. The vegetation also consists of uneven-aged trees, some with a more open canopy. Additionally, there are firs (Douglas, White), spruce, oak, forbs and grasses, and riparian areas including aspen, cottonwoods, alders, willows, forbs and grasses. Riparian vegetation is limited but exist in the project area, including willows, alders, cottonwoods, sedges, rushes, grasses and forbs.

**Table 2. Ecological Response Units, the Associated Seral and Climax Species, and Approximate Acreage in the Project Area**

Ecological Response Unit <sup>1</sup>	ERU acres in Santa Fe National Forest	Portion ERU in Project Area (acres)	Project ERU percentage (%) of ERU across Forest
<b>Mixed Conifer–Frequent Fire Forest</b>	429,967	17,858	4.15
<b>Ponderosa Pine Forest</b>	403,915	17,396	4.31
<b>Piñon-Juniper Woodland, Pinon-Juniper Grassland, and Juniper Grasslands</b>	274,864	8,670	3.15
Spruce-Fir	250,481	5,022	2.01
Riparian: primarily Narrowleaf Cottonwood/ Shrub	45,993	524	1.14
Montane/Subalpine Grassland	17,707	491	2.77
Mixed Conifer with Aspen	40,174	456	1.14
Colorado Plateau/Great Basin Grassland	41,639	139	3.34
Other (Alpine and Tundra)	5,015	10	1.99
<b>Totals</b>	<b>1,509,755</b>	<b>50,566</b>	

1. Bolded text indicates those ERUs proposed for treatment, as described in EA Chapter 2.



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Figure 2 – Ecological response units within the project area. (USDA 2020)

The desired condition for wildlife habitats is a resilient forest ecosystem with a mosaic of site-appropriate vegetation types consisting of a diversity of vegetation species, sizes, age classes, densities and distributions, which provides an array of habitat for the species that use the Project Area. Achieving the desired conditions outlined above for the ERUs (see Table 2) would also improve wildlife habitat. For example, creating more open stand conditions and openings would stimulate the growth of an herbaceous understory that provides forage, while retaining areas of denser growth and closed canopy would maintain habitat for species like the MSO. Restoring forest structure with multiple age classes, and retaining snags would also provide a diversity of habitat types for multiple species including goshawks and Merriam's turkey (*Meleagris gallopavo*). Similarly, reaching the desired conditions for wildfire risk would also help protect wildlife habitat from being destroyed in a catastrophic wildfire. (USDA 2021)

## **ALTERNATIVES CONSIDERED IN DETAIL**

For specific details regarding the Project Proposed Action and No Action alternatives see the Project Record, specifically the Silviculture Report and EA (USDA 2020). The following descriptions of the alternatives are derived from the descriptions in the Project EA.

### **Alternative 1 – No Action**

Under the No Action Alternative, current management plans would continue to guide management of the project area. No prescribed burning, vegetation and restoration treatments, or road maintenance, would be implemented to accomplish project goals within the project area, unless approved through a separate NEPA document and decision. The existing conditions would remain under the existing trends.

### **Alternative 2 – Proposed Action**

As part of the proposed action, Integrated Design Features (IDFs) have been developed to guide how the proposed action would be implemented. These IDFs are in addition to standards and guidelines from the Santa Fe National Forest Plan (Forest Plan), as amended, and Best Management Practices (BMPs). During implementation, all applicable guidelines and policies would be followed. These include, but are not limited to, Regional Invasive Species guidance, and Threatened and Endangered Species Recovery Plans. Please see the Project EA and the Appendices at the end of this document for a list of IDF's applicable to wildlife.

**Table 3. Proposed Activities/Treatments, Tools and Acres.**

Proposed Activities/Treatments	Tools to be Used for Implementation	Approximate Acres or Miles Proposed for Treatment
Vegetation Thinning using Thin from Below	Hand thinning Manual harvesting using chainsaws Mechanical methods such as mastication	18,000 acres
Use of Prescribed Fire	Broadcast burning Pile burning Jackpot burning	38,000 acres
Riparian Restoration	Conifer and non-native species removal Indirect use of prescribed fire Herbicide application Native tree planting Fencing	680 acres 17 miles of stream
Road Closure	Closure of 1.5 mile along Forest Service Road 79W	1.5 miles

“The Proposed Action does not define specific treatment units, but rather general areas throughout the project area where treatments are most likely to occur and the suite of tools that would be used.”  
(USDA 2021)





### Santa Fe Mountains Landscape Resiliency Project - Northern Extent

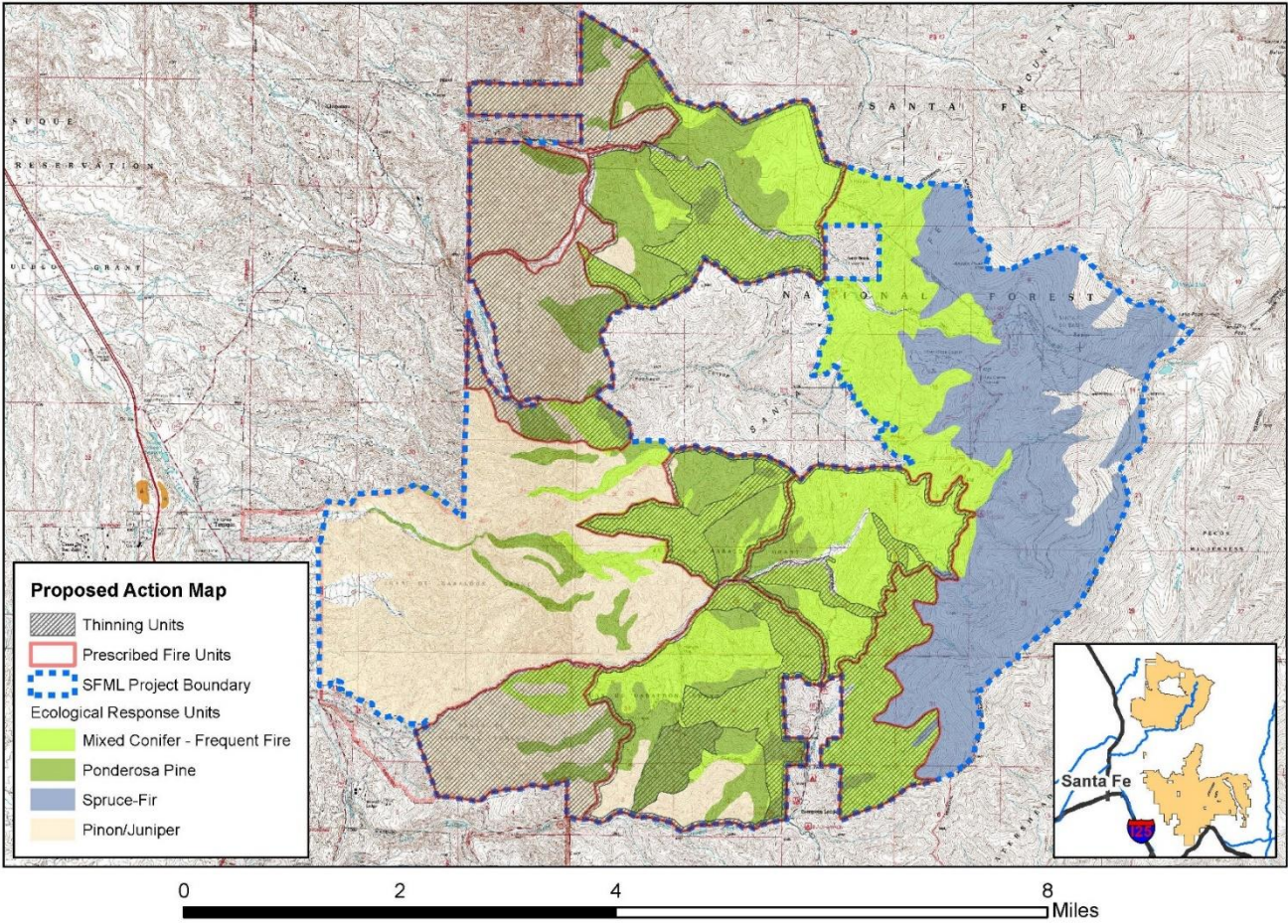


Figure 3. Potential vegetation thinning and prescribed fire treatment units for the northern portion of the project area



### Santa Fe Mountains Landscape Resiliency Project - Southern Extent

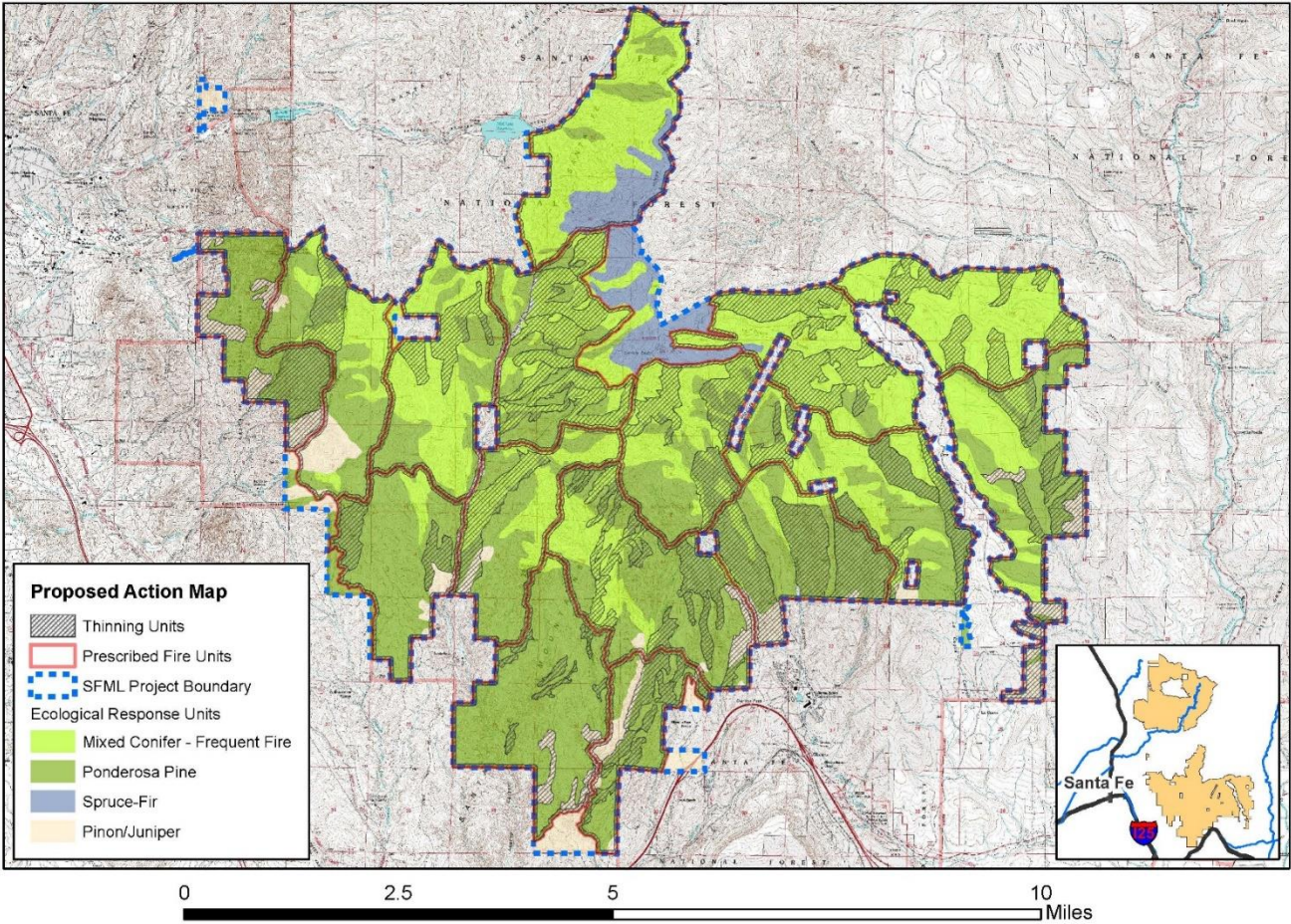


Figure 4. Potential vegetation thinning and prescribed fire treatment units for the southern portion of the project area

## Vegetation Thinning

**Table 1. Ecological Response Units Proposed for Vegetation Thinning Treatments**

Ecological Response Unit(s)	Total acres within SFMLRP Footprint	Total acre thin from below to a target BA (16" DBH/12" DRC limit)
Spruce-Fir	5,022	-
Montane/Subalpine Grassland	491	-
Mixed Conifer with Aspen	456	-
Mixed Conifer–Frequent Fire	17,875	7,500
Ponderosa Pine	17,347	6,500
Piñon-Juniper Woodland, Pinon-Juniper Grassland, and Juniper Grasslands	8,660	4,000
Narrowleaf Cottonwood/Shrub	503	-
Colorado Plateau/Great Basin Grassland	139	-
Other	63	-
<b>Total</b>	<b>50,556</b>	<b>18,000</b>

Manual and mechanical vegetation thinning treatment methods would include but are not limited to the following: the use of chainsaws to cut trees and distribute slash, masticators to thin trees and manipulate slash material, excavators for machine piling of slash and fire-line construction. Other specialized equipment may be used to treat the fuels to meet resource objectives. No mechanical equipment would be used on slopes greater than 40%. Lop and scatter or piling of thinned material would occur depending upon site conditions. Forest products would not be generated as a part of this project with the exception of fuelwood gathering where conditions allow and do not conflict with resource objectives.

Thinning of unhealthy, intermediate, and suppressed trees would improve tree growth, tree vigor, and create stand structure by providing more growing space for the residual trees and thus would meet uneven-aged desired conditions.

Uneven-aged structure would be emphasized by implementing treatments to create openings, break stand continuity, and allow for regeneration of site-appropriate vegetation. To achieve uneven-aged forest structure and diversity, understory and mid-story trees would be left in select locations, often as leave-islands across the landscape. Conifers within grasslands and meadows would be cut to allow for open conditions that promote grasses and forbs.

No trees with diameters greater than 16-inches diameter at breast height (DBH) or 12-inches diameter at root collar (DRC) for *Juniperus* spp. and *Pinus edulis* would be cut. Not all treatment units would require thinning up to that 16-inch DBH or 12-inch DRC limit to meet treatment objectives. In all likelihood, site-specific treatments and prescriptions may utilize a smaller tree diameter limit.

### ***Thinning within Mexican Spotted Owl Habitats***

Vegetation thinning within or adjacent to Mexican spotted owl protected activity centers (PAC) would be avoided to the greatest extent practicable. However, through the conditions-based management

approach, the U.S. Forest Service may evaluate forest stand conditions within or adjacent to Mexican spotted owl PACs that require vegetation thinning treatment in order to safely and effectively re-introduce prescribed fire in a treatment unit. In those cases, the same silvicultural strategy to thin from below to a target basal area would be followed within or adjunct to Mexican spotted owl protected activity centers, but with a lower diameter limit. Within Mexican spotted owl PACs, vegetation thinning treatments would be limited to the removal of trees less than or equal to 9 inches DBH and only to address ladder fuel concerns. A target basal area (BA) of 150 square foot per acre or higher would be included in the silvicultural prescription. No treatments would occur within the nest core of each PAC.

Implementation of treatments within MSO PACs would occur using a phased approach. Treatments would only occur in one project area PAC per year and the same PAC would not be treated more than once per 5 years. Pre- and post-treatment monitoring would occur so the impacts of treatments can be understood before proceeding with treatments in additional protected activity centers.

**Prescribed Fire**

Broadcast, maintenance, jackpot and pile burning are all types of prescribed fire activity proposed for the project. Prescribed fire would be utilized under specific environmental conditions (e.g. wind, relative humidity, fuel moisture, weather forecasts, etc.), which allows the fire to be confined to a predetermined area and produces the fire intensities and rates of spread required to attain planned resource management objectives. Natural and existing features such as rocky slopes and travel routes may be used as prescribed fire containment lines. There is the potential need to construct fire lines via hand tools or mechanized equipment in order to confine fires to predetermined areas.

Prescribed fire could be used as a stand-alone restoration treatment or could be used after other vegetation thinning treatments, for example, to remove slash after initial manual and/or mechanical treatments are completed.

**Table 2. Proposed Prescribed Fire Treatments (in acres) by Ecological Response Unit**

Ecological Response Unit(s)	Total acres within SFMLRP Footprint	Acres proposed for use of prescribed fire
Spruce-Fir	5,022	-
Montane/Subalpine Grassland	491	-
Mixed Conifer with Aspen	456	-
Mixed Conifer–Frequent Fire	17,875	17,000
Ponderosa Pine	17,347	17,000
Piñon-Juniper Woodland, Pinon-Juniper Grassland, and Juniper Grasslands	8,660	4,000
Narrowleaf Cottonwood/Shrub	503	-
Colorado Plateau/Great Basin Grassland	139	-
Other	63	-
<b>Total</b>	<b>50,556</b>	<b>38,000</b>

Prescribed fires would be ignited either by hand or by aerial ignition. The method of ignition for each prescribed burn unit depends on personnel safety, current and predicted weather, topography, vegetation, and the intensity of the fire needed to meet pre-established goals of the burn. Prescribed

fires are typically planned during or immediately following monsoon season, during winter, or at other times of the year when fuels and soils have sufficient moisture to reduce damage to residual trees, to meet resource objectives, and to confine the fire to the desired burn footprint. In order to reduce the potential for soil movement and erosion, mechanical equipment associated with prescribed fire would not be used on slopes greater than 40 percent.

A prescribed fire plan (burn plan) would be completed prior to the ignition of all planned prescribed fires. Burn plans are official site-specific implementation documents prepared by qualified personnel, approved by the agency administrator, and include criteria for the conditions under which the burn would be conducted to meet management objectives, including resource protections.

Initial prescribed fire treatment would be followed by maintenance burns approximately every 5 – 10 years.

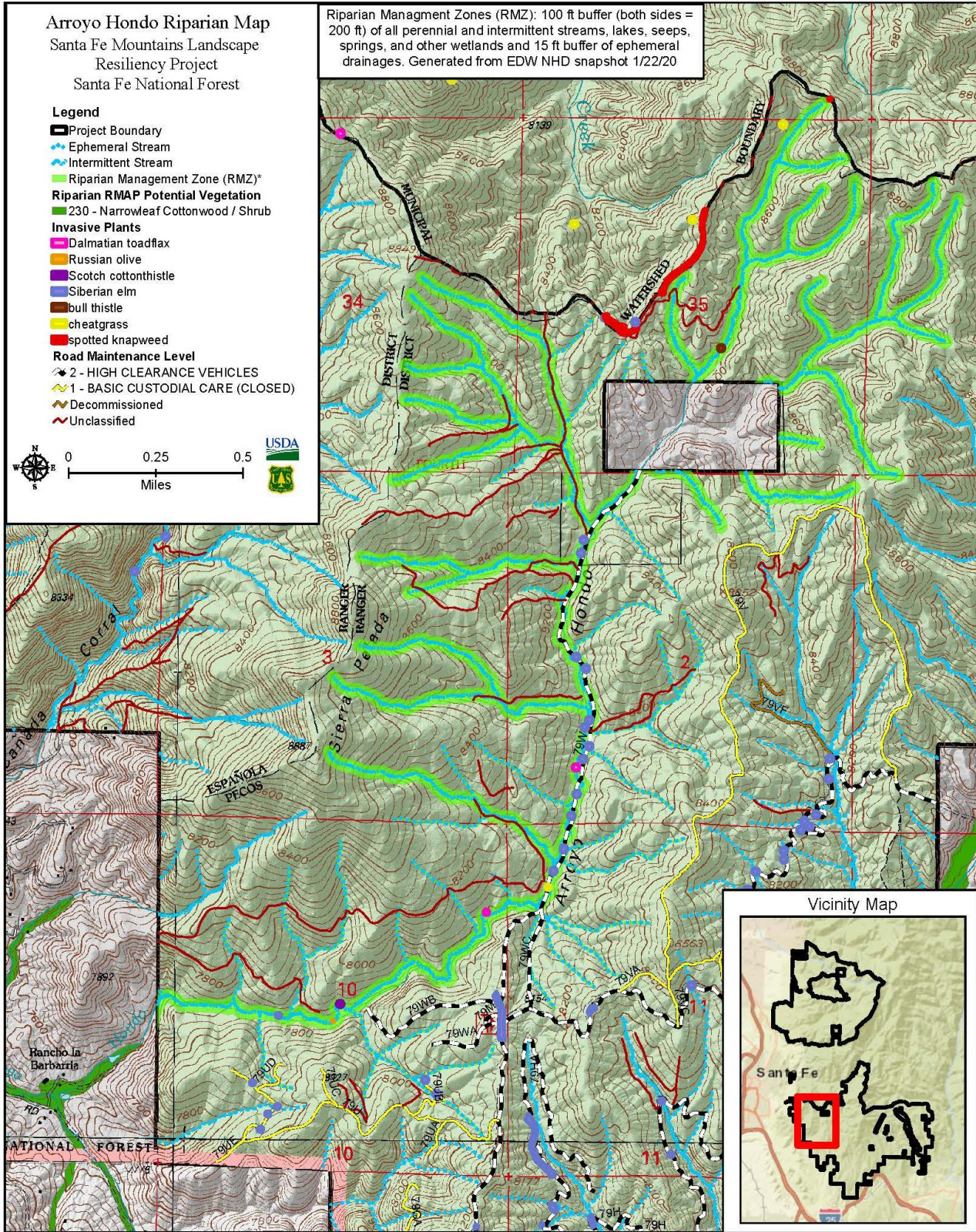
### ***Prescribed Fire in MSO Habitats***

Prescribed fire would be used in MSO PACs, outside of the MSO breeding season. Prescribed burns may be allowed within MSO PACs during the breeding season only if the PAC is determined to be unoccupied or the owls are determined to be not nesting, as inferred from results of surveys conducted according to the Mexican spotted owl protocol (USDI FWS 2012). Prescribed fire within MSO PACs would be implemented to achieve low intensity/severity fire and effects. Prescribed fire within MSO PACs and recovery nest/roost habitat would be conducted at low intensity with low-severity effects. Dead and down woody material and snags would be retained to meet the Mexican spotted owl recovery plan (U.S. Fish and Wildlife Service 2012) by following IDFs, such as not targeting these features for ignition.

### ***Riparian Restoration***

Riparian restoration treatments within an estimated 100-foot buffer of established waterways are proposed along approximately 4.5 miles and 370 acres of Arroyo Hondo (Figure 5) and approximately 12.5 miles and 310 acres of Tesuque Creek (Figure 6) to improve watershed conditions. Vegetation thinning, prescribed burning, and native species plantings would occur in areas where riparian vegetation is in poor condition, or in areas of conifer encroachment. Conifers would be thinned, as needed to improve riparian condition, up to 12 inches dbh. Prescribed fire would be indirectly introduced by allowing low intensity prescribed fire to back into the riparian areas from upland areas. This indirect use of prescribed fire would reduce understory fuels and promote riparian vegetation growth while maintaining riparian functions. Fencing may be installed if needed to protect restored areas if it is determined that riparian vegetation regeneration is being hampered by browsing and grazing. Riparian restoration treatments outside the Arroyo Hondo and Tesuque Creek areas would follow the conditions-based management approach.

In addition to these riparian-focused treatments, riparian areas would be surrounded by Riparian Management Zones (RMZ) which provide an area for special consideration when treated by other project activities, such as thinning and burning. These RMZs cover approximately 9,378 acres across the project area and would protect the riparian and aquatic habitats they encompass.



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Figure 5. Proposed Riparian Restoration Area along Arroyo Hondo. RMZs would not only cover the areas shown on this map, but also riparian and aquatic habitats across the project.

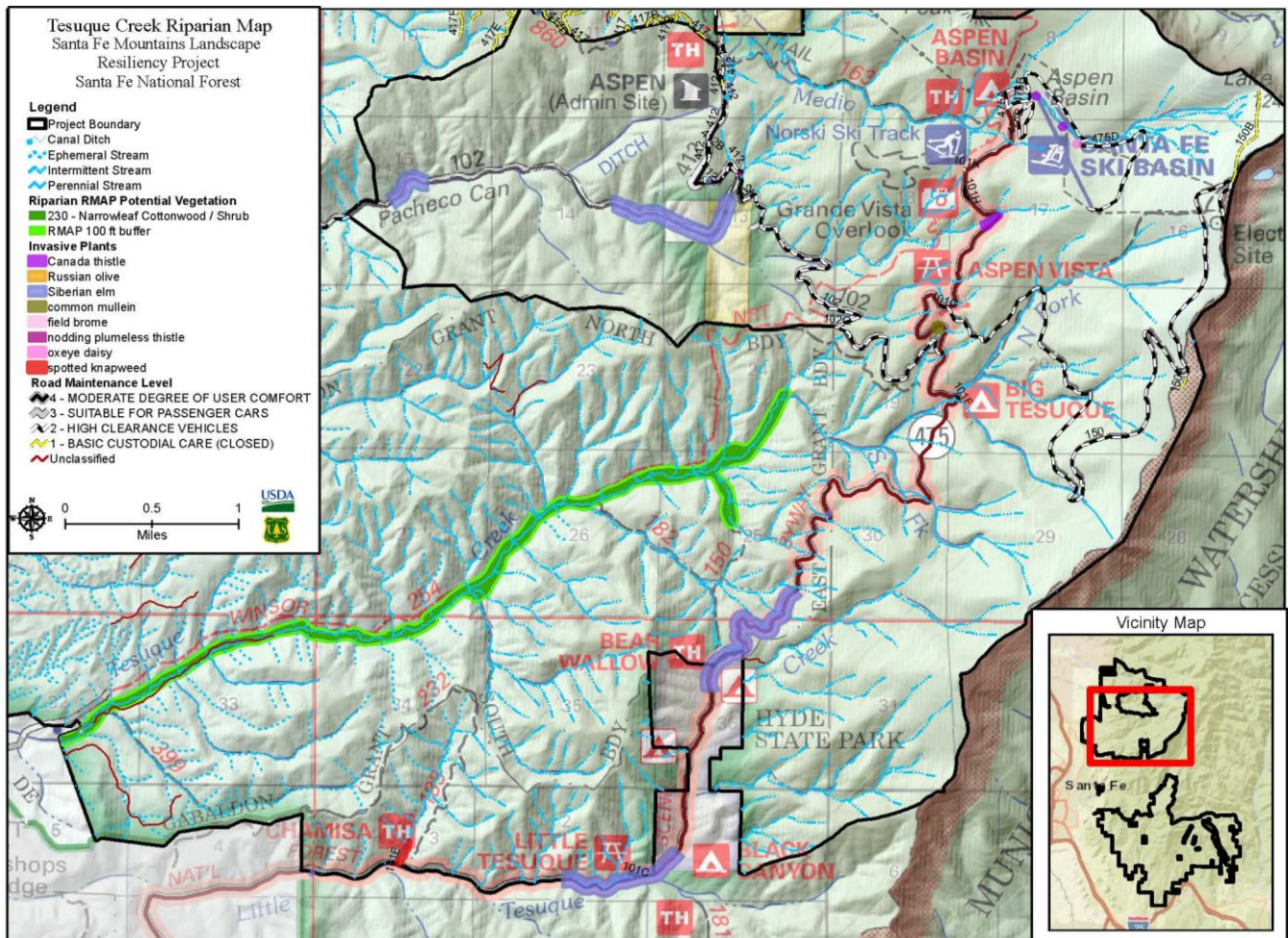


Figure 6. Proposed Riparian Restoration Area along Tesuque Creek

**Road Closure**

Approximately 1.5 miles of Forest Road 79W (Figure 7) would be gated and closed to public motorized access. The proposed road closure would help reduce resource impacts, specifically soil erosion and compaction and water quality. This road would still be accessible by vehicle by private landowners.

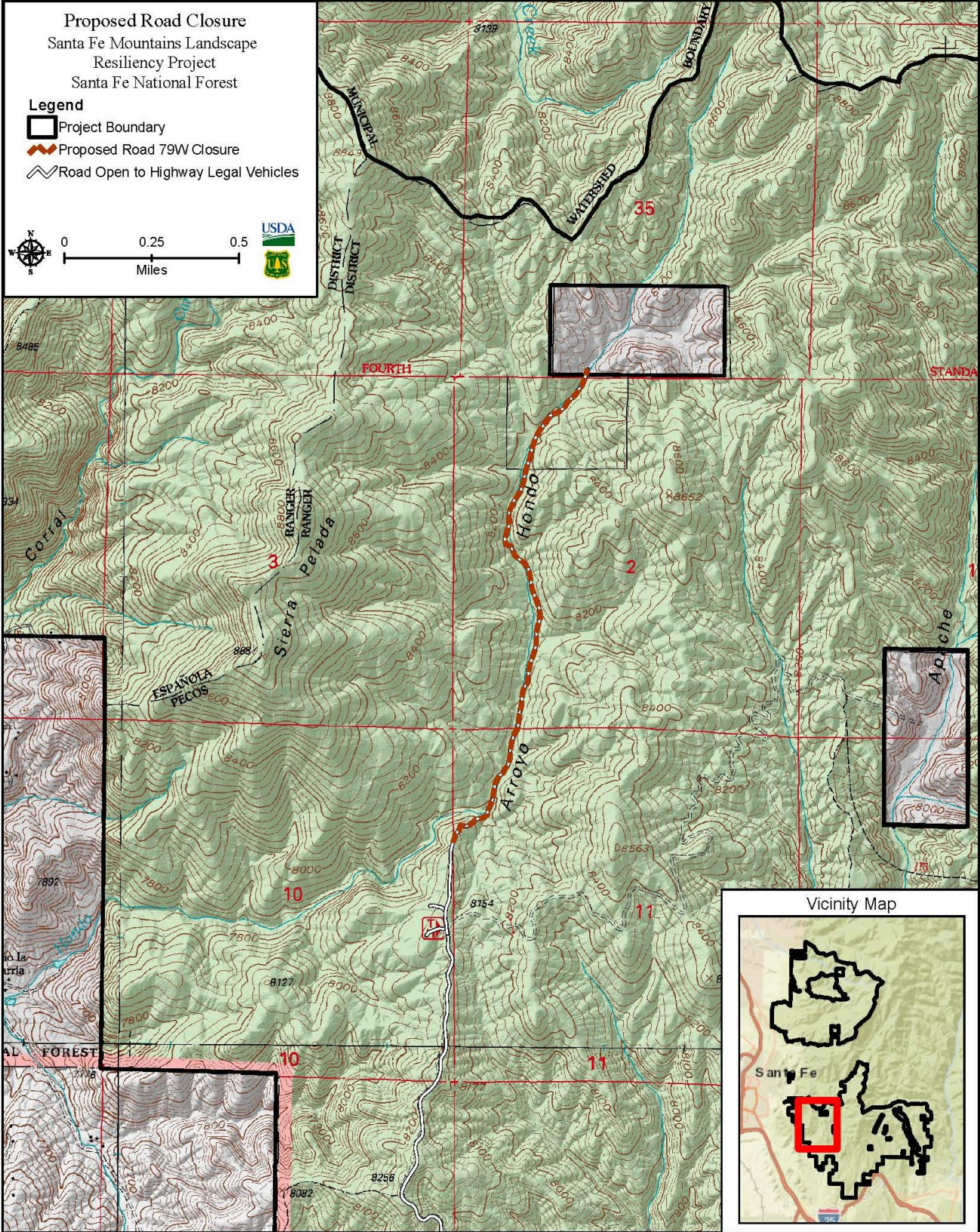


Figure 7. Proposed Road Closure on Forest Service Road 79W



### **Forest Plan Amendment**

As part of the proposed action, a Forest Plan Amendment is needed in order to meet the project objectives and to ensure the project proposed actions are following the current MSO Recovery Plan (2012) and best available science/management recommendations, such as for goshawks. A detailed discussion of the Forest Plan Amendments can be found in the project record. The amendments broadly include the following-

- A. Adopt aspects of the current MSO recovery plan (the existing Forest Plan includes the outdated MSO Recovery Plan (1995)), such as treating vegetation related to MSO PACs.
- B. Clarifies activity restrictions during MSO breeding seasons
- C. Clarifies need for interspaces related to Goshawk habitat

## **ACTION ANALYSIS AREA**

The action analysis area (AA) consists of the area which may be affected by the proposed action. This includes all areas to be potentially affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CRF §402.02). The analysis area is usually larger than the project area footprint.

The analysis area is defined (Appendix B - Map) for analysis in this BE as the project area plus a half-mile buffer. This analysis area will be used to consider potential effects that may go beyond the project boundaries, such as noise disturbance or use of the area by individuals of the species that may reside adjacent to the project area.

## **GENERAL HABITAT IMPACTS DISCUSSION**

### **Alternative 1 – No Action**

The no action alternative represents a continuation of the current conditions and trends. Vegetation would continue on the current trajectories, generally becoming denser. Wildfire risk would continue to increase over time with the consequence that large areas of suitable habitat for sensitive species could burn at high severity during a wildfire, rendering the habitat unsuitable, both short-term and well into the future. This would be harmful to most species due to potential for total loss of key habitat components (nest/roost/den/reproductive sites, increased sedimentation of streams, loss of prey habitat, etc.), however, such an event could provide some benefits to species such as woodpeckers. However, woodpeckers do not need large wildfires to thrive, as they use mortalities of trees from other events such as insect and disease-killed trees and pockets of burned trees during small fires. Large, high-intensity wildfire can change stand composition for decades or longer, and effectively change the distribution of sensitive species in the analysis area during that time.

The no action alternative does not move the project area toward desired conditions. The no action alternative continues to promote habitats that become more homogenous over time and are less resilient to disturbance and drought due to the lack of variation and the increased competition for resources and susceptibility to insect and disease encroachment due to overstocking. Less resilient habitats are more at risk to large scale catastrophic events that can remove large areas of habitats. The no action alternative does not promote a diversity of habitats for a diversity of species.

Table 1 did not include a discussion for sensitive species relative to the no action alternative because this alternative largely is the current condition and thus the species would continue on their current trajectories. Some comparisons of habitat differences between the alternatives is discussed in Table 6.

This is also the case for MIS and species considered further in the document. For additional details about vegetation conditions, see the effects discussion for goshawks below.

## Alternative 2 – Proposed Action

This project proposes to use a toolbox approach for treatment implementation. This allows managers to determine which treatments are needed in each given acre prior to implementation based on the site-specific conditions across the project area. With this approach, it is unknown where the exact treatments would occur and thus requires some assumptions to be made for habitat and species analysis. Treatments have been narrowed down to areas that would be potentially treated based on currently known information such as vegetation type and slope. It is anticipated that not every acre of the proposed acres would be treated by each treatment as other factors dictate treatment options, such as steeper slopes than expected, vegetation condition already meeting desired conditions, presence of heritage sites, design features, etc. However, this analysis, assumes that all potential treatment acres would be treated. This means that the actual potential impacts are likely to be slightly less due to slightly less treatments actually being implemented than were analyzed. As such, discussions of acres and effects should be understood as approximations.

The proposed actions (thinning and burning) should have a stimulating effect to the herbaceous understory by opening the canopy and the understory to allow for more light and less competition for resources amongst the vegetation. Prescribed burning would reduce woody debris (mostly small and medium sized) and recycle nutrients to the soil. It would reduce tree competition and allow for increased tree growth. This would create more forage in the form of grasses, leaves, flowers and seeds for species such as small mammals, insects, reptiles, songbirds (goshawk prey), mule deer and black bear. Deer and elk use is light in the area, but forage available to them would increase after prescribed burning, providing higher quality foraging opportunities.

Herbaceous cover immediately after burning would be limited for small mammals for a short period until vegetative regrowth occurs. This could make them slightly more susceptible to predation until regrowth occurs, thus could be a benefit to predators such as goshawk. After regrowth of vegetation, small mammal populations may increase due to increased forage and vegetative cover. Burning would likely be scheduled in late fall going into winter. Prescribed burns that occur in late fall and winter may reduce herbaceous cover for small mammals temporarily. However, these impacts would be limited since plants are typically dormant during these seasons, and because spring moisture typically follows soon after. The arrival of spring moisture facilitates sprouting and regrowth following a burn. If burning happens in the spring, there is often a green-up, sprouting period when monsoonal moisture arrive, typically in the late summer. Therefore, after prescribed burning, there would usually only be a few months until vegetation is provided the conditions to sprout.

In the growing season following thinning and burning, grasses would produce taller grass cover providing for an abundance of insects which are food for many species including turkey poults, neotropical migratory birds (goshawk prey) and their nestlings, predators, small mammals, and amphibians and reptiles. Taller grass would provide improved protective cover along streams. Streamside vegetation also acts as a filter of sediment and provides hiding cover along banks for aquatic and riparian associated species.

In drier areas, ponderosa pine and pinyon juniper provide cones, mushrooms and forbs as foods for a variety of birds such as the hairy woodpecker, junco, wren, and warblers and squirrel (all potential goshawk prey). These opportunities would continue to exist after project implementation and may improve due to increased openings and reduced vegetative competition. Scavengers and predators hunt the area for small mammals, birds, or carrion. All of these components of wildlife habitat would be

only slightly reduced temporarily, immediately following prescribed burning because burning would likely be scheduled in late fall into winter when plant and insects are dormant. The burned area would then create fertile seedbeds for new growth when emerging from snow cover or when monsoons rains occur. A more diverse vegetative community would provide opportunities for foraging, nesting and denning for numerous species across the project area.

For additional details about vegetation conditions, see the effects discussion for goshawks below.

**Table 6 – Habitat Effects Compared.**

Resource	No Action - Current Condition	Proposed Action
Wildlife (Sensitive)	Loss of suitable habitat for northern goshawk with gradual loss of large tree groups. Risk of habitat loss from high-intensity wildfire remains elevated.	Increase in habitat diversity. Objective of vegetation mosaics (structure, age, size, distribution, arrangement, species, etc.) would provide continued and increased opportunities of numerous species. Reduced risk of habitat loss from high intensity wildfire. Thinning would remove some habitat in the short term. Thinning would provide long term benefit to goshawk habitat and prey species (small mammals and birds), and other species.
Wildlife MIS	Risk of habitat loss from high-intensity wildfire remains elevated, which could lead to an excess of snags.	New herbaceous plant and shrub growth would benefit many MIS. Snag-dependent species would not change because of retention of larger trees and snags.
Wildlife Migratory birds	Risk of habitat loss from high-intensity wildfire remains elevated.	Actions (thinning & burning) that open forest canopy and reduce density would improve habitat conditions for many species by increasing diversity of habitat structure, sizes, vegetation species and arrangement. Some nests and nest trees/shrubs may be unintentionally removed or burned, but would be a short-term impact. IDFs would minimize negative impacts.
Large Snags	No change short term. Risk of habitat loss from high-intensity wildfire remains elevated, which could lead to an excess of snags.	Snags would not be removed during thinning. Some may burn during prescribed burning, but would not be targeted. Some snags may be created by burning. Overall, no change. The proposed action promotes larger trees, which would eventually die over time, creating large snags.
Large Downed Logs	No change short term. Risk of habitat loss from high-intensity wildfire remains elevated.	Large Downed Logs would not be removed during thinning. Some may burn during prescribed burning, but would not be targeted. Some burned snags may fall and become downed logs. Overall, no change.
Large Trees (>16 inches dbh)	Large tree loss would continue over long term due to competition, insects and disease. Risk of habitat loss from high-	Large trees would not be removed during thinning. Some may burn during prescribed burning, but would not be targeted. Larger pine trees would likely not be killed during burning due to fire-resistant bark.

Resource	No Action - Current Condition	Proposed Action
	intensity wildfire remains elevated.	Large trees may experience less competition and improved health and resilience.
Canopy Cover over 40%	No change short term. Risk of habitat loss from high-intensity wildfire remains elevated.	Smaller/Medium-sized trees that are not removed would be allowed to expand their crowns to contribute to higher canopy cover. MSO Recovery Habitats that are currently over 40% canopy cover, would not be reduced below 40%.
Small Mammals	No change short term. Risk of habitat loss from high-intensity wildfire remains elevated. Aspen loss would continue so that species associated with aspen would decline.	Burning would limit cover for small mammals for a short period (less than a year), but subsequent growth would provide more cover. Stimulation of herbaceous understory; creates more prey forage in grasses, leaves, flowers and seeds. Improved aspen stands would contribute to diversity and abundance of prey.

## SENSITIVE SPECIES EVALUATION AND EFFECTS DISCUSSION

Effect determinations represent the overall expected effect of the proposed management actions on these species. In general, the effects of past actions are reflected in the current conditions described. Effects of the proposed action are described, based on the base lines established. The determinations are summarized in Table 1. The proposed action has been evaluated to determine the potential effects to species, and their habitats.

Species were eliminated from detailed evaluation based upon one or more of the following:

- a. lack of potential habitat;
- b. potential habitat would not be affected by the proposed project;
- c. area not included in historic or current range of the species;
- d. elevational limits;
- e. temporal limits; or
- f. extirpation of the species without current feasibility for reintroduction.

If species did not meet the above criteria, they are addressed below. For the Santa Fe Mountains Project, only the northern goshawk did not meet the criteria above because the species and its habitat are known to be present in the project and analysis area.

### Northern Goshawk

#### *Existing Condition*

Preferred habitat for the northern goshawk (goshawk) consists of coniferous forests with a variety of structural stages for nesting and foraging. Forest types occupied by the goshawk in the southwest are ponderosa pine (74%), mixed-species (23%), and spruce-fir (3%) (Reynolds et al 1992). Local data suggests similar habitat usage with observations and nesting occurring in ERUs of ponderosa pine, frequent fire mixed conifer and mixed conifer with aspen. At the nest tree/stand level, nests typically occur in mature to old-growth forests composed primarily of large trees, with high canopy closure, near

the bottom of moderate hill slopes, with sparse ground cover (Squires and Reynolds 1997 and Squires and Kennedy 2006). Goshawks nested 2.5 times more often than expected in stands with 70-79% canopy coverage and 5.8 times more often than expected in stands with 80% or greater canopy coverage (Squires and Reynolds 1997). The nest site is generally situated within one-quarter mile of a stream or other water source (Squires and Reynolds 1997). Goshawks prey on small to medium birds and mammals- from robins and chipmunks to grouse and rabbits (Reynolds et al 1992). The best foraging habitat occurs in a mosaic of structural stages scattered across the landscape (Reynolds et al 1992). In New Mexico, average home range size during the breeding season includes 1,400 acres for females and 5,200 acres for males (Squires and Reynolds 1997). The goshawk is documented on all Ranger Districts on the Santa Fe NF.

Potential foraging and nesting habitat for goshawk is present in the project area, specifically in the ponderosa pine ERU. Groups of large trees are presently suitable for nesting. One goshawk territory, the 649-acre Chamisa post-fledgling area (PFA), is located in the project area.

### ***Alternative 1 – No Action***

This effects discussion related to vegetation is largely derived, often directly mirroring, the project's silviculture report (USDA 2020). Current management plans would continue to guide management of the project area. No prescribed burning, vegetation and restoration treatments, or road maintenance, would be implemented unless approved through a separate NEPA document and decision. Without implementing treatments, forest conditions would continue their current trends, further departing from desired conditions. The risk of uncharacteristically severe wildfire would continue to increase. Forest structure would continue to transition into a homogenous state and would continue to be dominated by a single age class. Forests would lack the desired level of diversity in structure, species composition, and density that is essential to maintain habitats for species from predators to their prey. Forest susceptibility to insects and disease (e.g. bark beetles, defoliators, and mistletoe) would continue to increase. The landscape would not be moved toward desired conditions, and as such, the no action alternative would not meet the purpose and need for the project.

### **Direct and Indirect Effects**

It can reasonably be expected, given current trends of vegetation development and without the effects of disturbance (wildfire, insects, and disease), that all ERU within the project area would continue to experience individual tree growth, establishment of regeneration, increases in stand densification (canopy cover and basal area), and increases in tree to tree competition. However, disturbance is a component of the ecosystems of the project area and risk of disturbance events may increase or decrease over time as conditions change. It is expected that late seral and shade tolerant species would continue the trend of becoming the dominant species within the ecosystems of the project area. In general, shade intolerant species; such as ponderosa pine, Southwestern white pine, and quaking aspen; would become less represented in stands which have become more dense, while shade tolerant species, such as true firs, become more dominant due to their ability to grow and develop in areas that are more shaded. Additionally, given the shade intolerance of Southwestern white pine and the continued pressure exerted by white pine blister rust, it can reasonably be expected that Southwestern white pine would continue to diminish within the project area. It is expected that frequent fire systems, such as the dry mixed conifer and ponderosa pine forests, would become less structurally complex at a landscape level as stands trend towards a more homogeneous state, and spatial pattern dissolves as stands trend towards similar sized trees of similar density. State and transition modeling indicates a trend of other systems may become more diverse over time. This is due to the impacts of disturbance agents (fire, insects, and disease) which is accounted for by the model. Catastrophic fire risk is

expected to remain high for the frequent fire systems. This is due to the uncharacteristically high loading of ground, canopy, and ladder fuels within the dry mixed conifer and ponderosa pine forest systems. This trend is likely to continue until fire is re-introduced upon the landscape in the form of wildfire (which has a strong possibility of being uncharacteristic in severity and intensity) and, once re-introduced, the result is likely to be a resetting of seral stages to the Early Seral Stage (i.e. stand-replacing crown fire).

Overall health and vigor of forested stands are expected to diminish as stand stocking and resource competition increases. This is likely to result in impacts from disturbance agents such as drought, insects, and disease. Dwarf mistletoe, which is common in ponderosa pine and Douglas-fir, is likely to continue to slowly spread and would continue to stress infected trees and increase susceptibility to other disturbance agents, such as drought and other insects and disease (Beatty and Mathiasen 2003, Geils et al. 2002, and Hadfield et al. 2000). Endemic populations of bark beetles would continue to grow and outbreaks may become more common and larger in scale as tree vigor diminishes, resource based competition increases, and vegetative diversity diminishes (landscapes and ERU become more homologous) (Randall 2010a and Kegley 2011). Defoliation of Douglas-fir tussock moth and Western spruce budworm are expected to continue the trend of periodic outbreak, especially given that susceptible/host trees (Douglas-fir, true fir, and spruce) are common to dominant upon the landscape (USDA 2011 and Pederson et al. 2011).

Given current trends related to individual tree and stand growth and development, it can reasonably be expected that Old Growth, large trees ( $\geq 20$ " dbh/drc), and snags would increase. More specifically, until acted upon by an agent of disturbance, stands would grow more decadent and develop late-seral characteristics and individual trees would grow and, eventually, die (snag creation). This would result in a substantial reduction in diversity and resiliency as early seral species and structure become scarcer and threats to late seral species and structure (e.g. bark beetles, tussock moths, fire, etc.) become more significant in terms of impact and intensity.

Overall, the No-Action Alternative is expected to promote conditions which are more prone to uncharacteristic disturbance events and patterns, diminishing health and vigor of trees and stands, increasing dominance and over-representation of late seral species and late seral stand conditions, the simplification of species compositions and spatial patterns, and the reduction of fire-adapted ecosystems upon the landscape. None of these conditions are in-line with the Purpose and Need of the SFMLRP and are not anticipated to contribute to a healthy, resilient, and properly functioning ecosystem.

Current vegetation trends would be expected to continue across all vegetation types. This would include individual tree growth, regeneration, increases in stand densities, and increases in resource competition (water, light, nutrients) unless disturbance (wildfire, insects, and disease) occurs. However, the current trends also increase the risk of these disturbances to occur and to be more widespread. This presents the risk that vegetation and habitats could be at risk of widespread type change. With this brings a risk to available suitable habitats, especially for the goshawks.

As habitat becomes more dense, competition may lead to the mortality of large trees that goshawks depend upon for nesting and roosting. Dense understory trees may reduce the ability of individuals to forage if flight movements become more difficult. Dense forests shade out understory grasses and forbs that prey species may depend upon and thus creates a potential reduction in available prey for goshawks. Dense conifers outcompete and shade out hardwoods, both in the uplands and in riparian areas. As this continues on the current trajectories, riparian and upland hardwoods may become suppressed and less abundant, subsequently reducing habitat diversity for goshawks and their prey. Development of areas that have the potential to become nesting and roosting habitat would be slowed

or halted as intercompetition prevents trees from growing to their potential and reaching sufficient size and structural complexity to provide suitable structure for nesting, roosting, or foraging.

Overall, existing habitat for goshawks would remain as it currently exists unless impacted by disturbance (wildfire, insects, and disease), with some areas gradually becoming goshawk habitat and other areas deteriorating to no longer be suitable habitat.

**Alternative 2 – Proposed Action**

This effects discussion related to vegetation is largely derived, often directly mirroring, the project’s silviculture report (USDA 2020). Up to 18,000 acres would be treated by thinning (by hand and/or mastication) and up to 38,000 acres would be treated by prescribed fire. These actions would reduce fuel loadings; surface, ladder, and canopy; and re-establish fire upon the landscape as a naturally occurring and desirable ecological process. Additionally, treatments would promote ecological resilience, forest health, catastrophic wildfire risk reduction, and old growth promotion and retention. Treatments are proposed to be implemented under a “conditions-based” approach. Each treatment type (prescribed fire, thinning, mastication, etc.) may be used as a stand-alone treatment or in conjunction with other treatment types. Prior to treatment implementation, silvicultural prescriptions would be written by a USFS Certified Silviculturist to meet Regional standards and objectives for vegetation, habitat and resource protection as described in this report and in the project EA.

**Table 7. Proposed Thinning and Prescribed Burning Treatment Areas by ERU; Acres and Percentages.**

Ecological Response Unit	Project Area	Thinning or Mastication		Prescribed Fire	
	Acres	Acres	Percentage (%)	Acres	Percentage (%)
<b>Mixed Conifer- Frequent Fire</b>	17,875	7,500	42%	17,000	95%
<b>Ponderosa Pine</b>	17,347	6,500	37%	17,000	98%
<b>Piñon-Juniper</b>	8,660	4,000	46%	4,000	46%

**Direct and Indirect Effects**

Thinning would only occur on about 18,000 acres of the project area and burning would only occur on about 38,000 acres of the 50,566-acre project area. When considering each ERU, less than half of each ERU would be thinned, providing a continuation of the existing available habitat. These unthinned areas would be representative of a variety of conditions and vegetation types currently on the landscape. This would also be represented within each treatment unit as leave-islands would remain to provide a mosaic and diversity of habitats for numerous wildlife species, including goshawk.

Burning would occur on the majority of the treatment acres of each ERU listed above in Table 7. Burning is proposed to be implemented in a manner that would result in a mosaic of burned and unburned areas, with mostly areas burned with low and moderate intensity. This type of burning is implemented in order to reduce the density of the understory while maintaining the overstory vegetation, thus retaining ERU type and function.

Thinning would create a clumpy tree distribution favoring the healthiest trees across all size classes. Fire tolerant species would be preferred leave trees, thus contributing to the overall health and resiliency of the forested vegetation types, such as those that provide goshawk habitats. Trees larger than 16” dbh would not be cut, except for safety concerns. The majority of trees to be cut as part of this project would be well under 16” dbh. Desired conditions often can be achieved through the removal of trees smaller than 11” dbh. With the majority of trees to be removed in that smaller size range, and

lesser need to remove trees in the 12 to 16” dbh range, the majority of trees that contribute to goshawk habitat would remain, thus continuing to contribute to goshawk habitat needs.

Thinning would encourage the remaining trees to grow into larger diameters. Over time, as competition between trees is reduced through thinning and burning, the remaining trees are expected to increase in size and canopy, thus increasing in contribution to goshawk habitat stand characteristics.

Restriction on canopy cover removal in goshawk and MSO Habitats contribute to areas remaining suitable for goshawks, maintaining 40% canopy cover across much of the project area (IDF- NOGO-13).

The acres that would be burning-only would not see the same reductions in tree densities as the thinned areas. The majority of the fire-induced tree mortality would be mostly in the smaller tree diameters, less than 6 inch in diameter at breast height (dbh). Prescribed burning would augment the thinning work and increase canopy base heights (CBH). Burning increases crown-to base-heights on residual trees because of the scorching that occurs which kills the bottom limbs. This reduces the risk of torching and crown fires during wildfires.

Prescribed fire and subsequent effects would be patchy since the entire area would not be expected to burn due to discontinuity of fuels, especially if burned during fall, winter and early spring. Prescribed burning would be done when the soil is moist (IDFS- RX-7, Soil-7, Soil-8). This would minimize negative impacts to the soil and promote vegetation diversity.

Forest Vegetation Simulator (FVS) is a forest growth simulation model used for and described in the silviculture report. It simulates forest vegetation change in response to natural succession, disturbances and management. Modeling indicates that pre-treatment (current condition), a potential wildfire in the area would likely result in a crown-fire, while a potential wildfire in the project area, post-treatment, would likely maintain as a surface-fire. There are many real world examples where crown fires have dropped to the ground and become ground fires after encountering areas treated to reduce fuels. These areas of reduced fuels help not only that specific area, but also adjacent areas that have not yet been treated, both in and outside of the project area, including goshawk and other adjacent habitats.

The thinned areas combined with burned areas would create a matrix of overlapping treatment areas of decreased fuel hazard. An overlapping fuel treatment pattern is effective and efficient in disrupting fire growth across landscapes and can mitigate fire behavior and effects within burned areas and even outside treatment areas. Additionally, this would leave a diversity of habitats post-treatment that would provide cover and forage for both goshawks and their prey, in addition to other wildlife species.

The project area would be divided into burn units which would generally be blocks of approximately 100-300 acres. Burning across the project area would be done over several years. To mitigate the risk of escaped fire, broadcast burning would be done largely in the fall as condition (like smoke transport) allow. Spring burns would be avoided unless Fall-like conditions were present and if necessary to mitigate potential smoke transport concerns. Fall temperatures are cooler and relative humidity is higher than in the spring or summer, which reduces fire intensities and the probability of spotting, escape and undesirable fire effects. Burning in the fall also removes the risk of disturbing nesting birds, specifically goshawks. If spring burning occurs, there could be a risk of disturbing nesting goshawks, however this would be mitigated by survey requirements prior to treatments and associated project integrated design features.

Riparian vegetation would not be removed by this project. Thinning and burning would be done in riparian areas in a manner that would protect and promote riparian vegetation. Riparian areas would be surrounded by Riparian Management Zones (RMZ) which provide an area for special consideration when treated by other project activities, such as thinning and burning. These RMZs cover approximately 9,378 acres across the project area and would protect the riparian and aquatic habitats they encompass. Some riparian areas would have encroaching conifers removed allowing riparian



vegetation, such as cottonwoods, willows and alders, to expand, and contributing to diversity and improved goshawk habitat. Riparian areas would also indirectly benefit from this project, as the surrounding area treated by this project would reduce the risk of catastrophic wildfire in the riparian areas, thus maintaining riparian areas for goshawk foraging use.

Small openings would be created thus regenerating the forest, including conifers, brush, forbs and grass, and regenerating aspen which are declining in the area largely due to fire suppression. These habitat improvements would meet the needs of many goshawk prey species. This would also create a mosaic of structural stages scattered across the landscape, which provides diverse foraging habitats.

The appendices include management guidelines that would protect and improve habitat for goshawk. The Mexican Spotted Owl protection measures are designed for the owl, but would also provide habitat for goshawk as their habitats often overlap. Additionally, the IDFs in the appendices are designed to maintain habitat features, such as snags and downed logs, while also promoting stand diversity such as openings, but also leaving some dense tree groups. Topography would also limit treatment options or efficacy in some areas, resulting in a mosaic of treated and untreated areas.

Project activities would benefit and protect goshawks by meeting MSO recovery plan guidelines and follow the applicable mitigation (conservation) measures contained in the Forest Plan and Recovery Plan (Appendix A) which includes timing restriction, diameter limits for tree cutting, etc.

The Forest Plan guidelines for goshawk habitat management would be followed. The proposed action incorporates management for goshawks habitats as part of the toolbox approach as directed by the Forest Plan. The Forest Service is following the goshawk recommendations of the Forest Plan by implementing burning activities in a manner that would protect and create the key habitat components of goshawk habitat and improve herbaceous understory development. This action would result in more resilient and sustainable habitat for goshawks, and would reduce fire risk to potential habitat in the ponderosa habitats.

The Forest Plan provides sideboards ensuring habitats are considered, protected and improved during project implementation. Integrated Design Features (IDFs) provide further parameters that would be included. In the Appendices, these parameters are listed. Some may directly relate to goshawk habitat, such as creating habitat diversity for them and their prey, by maintaining leave-islands (no-treatment) or creating openings, etc. Other parameters listed in the Appendices would have indirect effects to goshawk prey. For example, IDFs that protect the soil and subsequently vegetation, would maintain goshawk prey species, or IDFs that dictate how prescribed burning would occur in order to have lower impacts to soil and vegetation, would maintain goshawk prey. IDFs that reduce weed spread would maintain native plant assemblages in which goshawk prey depend upon. Leave No Trace practices would minimize the risk of entrapment and choking hazards. IDFs that protect riparian areas would maintain riparian species, riparian diversity, riparian function and water quality, which all provide habitat and prey habitat. Leave-islands would provide habitat diversity for goshawk and prey species. Promoting hardwoods, like Scouler's willow and oak would do the same. The IDFs work together to maintain and protect habitats for goshawk and their prey base. The understanding that all of the IDFs would be implemented leads to a lower effects determination by minimizing the potential for adverse direct and indirect effects.

Table 8. ERU Vegetation Types in the Project Area.

ERU	Acres	Percent (%) of Project Area
Alpine and Tundra	10.02	0.02
Colorado Plateau / Great Basin Grassland	139.19	0.28
Juniper Grass	222.83	0.44
Mixed Conifer - Frequent Fire	17,874.75	35.35
Mixed Conifer w/ Aspen	456.09	0.90
Montane / Subalpine Grassland	491.07	0.97
No Data	9.83	0.02
PJ Grass	1.38	0.00
PJ Woodland	8,436.15	16.68
Ponderosa Pine Forest	17,347.00	34.31
RMAP Narrowleaf Cottonwood / Shrub	503.44	1.00
RMAP Ponderosa Pine / Willow	30.81	0.06
RMAP Upper Montane Conifer / Willow	16.26	0.03
RMAP Willow - Thinleaf Alder	5.85	0.01
Spruce-Fir Forest	5,021.58	9.93
Total	50,566.25	100.00

Table 9. Slopes in the Project Area.

Slope	Acres	Percent (%) of Project Area
0-20 %	7,812.50	15.45
20-40 %	20,810.43	41.15
40-60 %	16,249.02	32.13
60+ %	5,694.31	11.26
Total	50,566.25	100.00

Table 10. ERUs in each Slope Range in the Project Area (*not all of these acres would be treated*).

R3 ERU	Slope Break	Acres	% of Project Area
Alpine and Tundra	0-20 %	1.17	0.00%
	20-40 %	6.39	0.01%
	40-60 %	2.45	0.00%
Colorado Plateau / Great Basin Grassland	0-20 %	122.69	0.24%
	20-40 %	13.25	0.03%
	40-60 %	3.10	0.01%
	60+ %	0.15	0.00%
Juniper Grass	0-20 %	25.32	0.05%
	20-40 %	95.10	0.19%
	40-60 %	86.23	0.17%
	60+ %	16.18	0.03%
Mixed Conifer - Frequent Fire	0-20 %	2,385.10	4.72%
	20-40 %	6,953.39	13.75%
	40-60 %	<b>6,053.32</b>	<b>11.97%</b>
	60+ %	<b>2,482.93</b>	<b>4.91%</b>
Mixed Conifer w/ Aspen	0-20 %	34.29	0.07%
	20-40 %	156.95	0.31%
	40-60 %	<b>209.62</b>	<b>0.41%</b>
	60+ %	<b>55.23</b>	<b>0.11%</b>
Montane / Subalpine Grassland	0-20 %	11.18	0.02%
	20-40 %	302.77	0.60%
	40-60 %	161.97	0.32%
	60+ %	15.15	0.03%
No Data	0-20 %	4.34	0.01%
	20-40 %	3.20	0.01%
	40-60 %	2.30	0.00%
PJ Grass	0-20 %	1.11	0.00%
	20-40 %	0.24	0.00%
	40-60 %	0.03	0.00%
PJ Woodland	0-20 %	1,525.80	3.02%
	20-40 %	3,237.74	6.40%
	40-60 %	2,725.47	5.39%
	60+ %	947.14	1.87%
Ponderosa Pine Forest	0-20 %	3,240.41	6.41%
	20-40 %	7,395.53	14.63%
	40-60 %	<b>4,966.96</b>	<b>9.82%</b>
	60+ %	<b>1,744.10</b>	<b>3.45%</b>

Riparian: Narrowleaf Cottonwood / Shrub	0-20 %	154.21	0.30%
	20-40 %	175.66	0.35%
	40-60 %	119.86	0.24%
	60+ %	53.71	0.11%
Riparian: Ponderosa Pine / Willow	0-20 %	13.97	0.03%
	20-40 %	9.55	0.02%
	40-60 %	6.32	0.01%
	60+ %	0.97	0.00%
Riparian: Upper Montane Conifer / Willow	0-20 %	4.20	0.01%
	20-40 %	5.58	0.01%
	40-60 %	3.85	0.01%
	60+ %	2.63	0.01%
Riparian: Willow - Thinleaf Alder	0-20 %	3.46	0.01%
	20-40 %	1.69	0.00%
	40-60 %	0.52	0.00%
	60+ %	0.18	0.00%
Spruce-Fir Forest	0-20 %	285.25	0.56%
	20-40 %	2,453.39	4.85%
	40-60 %	1,907.00	3.77%
	60+ %	375.94	0.74%

50,566.25 100.00%

*\*Bolted text is to draw attention to the vegetation types that are proposed for thinning and burning, to note that large quantities of those vegetation types are on steeper slopes, which indicates that those areas would not receive mechanical thinning and with higher slopes, the likelihood of hand-thinning is reduced, but not removed. This helps to understand that it is likely that those areas would have lower impacts from project treatments.*

Note that mixed conifer (35% of project area) and ponderosa pine (34% of project area) are the predominate vegetation types in the project area. Large portions of those two types fall on steeper slopes over 40%; about half of the mixed conifer and about a third of the ponderosa. This is indicated in **bold text** in the table above (Table 10); 8,801 acres of steep slope mixed conifer and 6,711 acres steep slope Ponderosa, for a combined 15,512 acres (31% of the project area). Steep slopes over 40% account for approximately 43% of the project area. Such areas would not be mechanically thinned. Steep slopes over 60% slope account for 11% of the project area. Such areas are less likely to be thinned due to excessive slope, but might be hand-thinned. The proposed actions account for some of this with only 7,500 acres proposed for thinning in the mixed conifer areas and only 6,500 acres proposed in the ponderosa habitat areas.

This is worth noting when considering effects; proposed mechanical treatment would not occur on such steep slopes and even handwork is less likely in areas especially over 60% slope, therefore, much of those areas would not receive the higher levels of disturbance (such as mechanical thinning or piling), thus minimizing effects to those areas of goshawk habitat. Only slightly over half of the project area (about 57%) is under 40% slope and could potentially receive mechanical treatments, thus minimizing the duration and spatial extent of disturbance. Without treatments in these areas, a large portion of the project area and specifically goshawk habitats would not be treated, leaving such areas to provide habitats as they currently exist.

The Chamisa goshawk PFA is located in an area that may receive treatments. As shown in Table 11 below, approximately 74 acres (about 11%) of the PFA would be available for possible mechanical treatment, 120 acres (about 19%) could be hand-thinned and 61 acres (about 10%) would likely not be thinned. The majority of the PFA would be proposed for burning only. This would help to maintain the diversity of this PFA, as prescribed burning would be implemented to burn at low intensity and achieve a mosaic burn pattern.

Table 11. Goshawk Management Areas in the Project Area.

Goshawk PFA	Possible Treatment Type	Acres	Percent (%) of PFA
Chamisa	Burning Only	393.75	60.68
	Project Area No Treatment	0.44	0.07
	Thinning and Burning 0-40%	73.77	11.37
	Thinning and Burning 40-60%	120.42	18.56
	Thinning and Burning 60+%	60.52	9.33
		648.89	100.00

Much of this project area consists of young, overstocked and dense stands of suppressed trees. Project treatments would help move these stands toward suitable goshawk habitat by shifting conditions so that more trees are in the larger size ranges, which provide better habitat than smaller trees sizes that are currently overrepresented in the project area.

There may be limited, short-term, negative impacts from thinning and burning, as the area would have above-usual noise and visual disturbance during and immediately following project implementation (such as thinning with chainsaws, and burning with smoke, but depends on season of implementation) and trees would be removed which would open the canopy in many places, potentially removing certain, localized areas from nesting habitat suitability and may change some areas used for foraging. However, in the long-term, understory vegetation would increase in quantity and diversity, thus promoting prey species habitat development. An increase in hardwood species, such as aspen, would

also provide diversity and increase foraging opportunities. Additionally, medium sized trees would become healthier and thus increase their crown size, contributing to canopy closure. The proposed action is also designed to reduce the risk and spread of stand-replacing wildfire and spread of insects and disease, which would protect suitable habitat in the long-term.

Some of this project area is impacted by concentrated human use along the highway, trails, trailheads, campgrounds and private land. This consistent human presence likely reduces the suitability for goshawk in those areas. These same areas are likely to be priority areas for treatment due to better access and to reduce the risk of wildfire spread to and from these features. With goshawk unlikely to inhabit these areas, such treatments focused in those areas are unlikely to disturb goshawk.

Implementation activities would occur in suitable habitats and during the breeding season for goshawk, only if protocol surveys have not indicated the presence of goshawk which would warrant protections, such as territory (Post-fledgling areas) designations and subsequent restrictions (IDFs- NOGO-2, 3, 4). Each treatment unit with suitable habitat would be surveyed prior to implementation, therefore goshawk presence would be known and applicable breeding season restrictions would apply in close proximity to goshawk observations in accordance with the IDFs (IDFs- NOGO-2, 3, 4) and Forest Plan direction. Therefore, negative impacts to goshawk from noise disturbance is not anticipated. Additionally, thinning within potential goshawk habitat and the Chamisa PFA would be primarily done by hand; therefore, noise disturbance would be reduced to areas where machinery is used, such as for mastication, machine piling and fire line installation. The option to use machinery is restricted to areas without steep slopes, which greatly reduces the spatial extent of such treatments.

The proposed action would incorporate adaptive management strategies, allowing for year-to-year adjustments in acres thinned, burned or a combination, with treatment order prioritized by need. Treatments, especially burning, would be broken up into smaller units across the project area. These units would not be completed all in one year. This would spread the effects across a longer timeframe, which allows treatment areas to respond to treatments (such as increase understory production of grasses and forbs) before and while the subsequent units are treated. This staggers the effects to goshawk habitats and subsequently to goshawk and their prey, over many years. Goshawk habitats would be thinned and/or burned, however, the exact locations for these treatments in any given year has yet to be determined.

Since treatments would occur within goshawk habitats and during the breeding season, there may be an impact to the species. The effects of the proposed thinning and burning is anticipated to result in minimal direct impacts to goshawk. Goshawk surveys are required within the suitable habitat, per the Forest Plan, prior to implementation. Some areas within this project have already been surveyed for goshawks, with one new nesting pair confirmed. When nesting is discovered/established, appropriate measures would be followed as described in the Forest Plan and the IDFs, such as breeding season restrictions, dbh limits, and the district biologist having to determine status (non-nesting or absence) for the year using accepted protocol standards, therefore reproduction would not be impacted.

If project implementation occurs during the fall, this would further minimize the risk of disturbance to potential, currently unknown goshawks within the analysis area. Project implementation during the goshawks breeding season would only occur after completion of the protocol surveying and no goshawks are detected within close proximity of each treatment unit.

Project implementation would take place in potential goshawk foraging and roosting habitats. In the proposed action, thinning would not remove large trees (over 16" dbh), snags or downed logs. Prescribed burning may have a small impact on these habitat features. Most large trees would survive low and moderate intensity burning, however, some larger firs may experience negative effects,

including mortality, due to their relatively thin bark. These effects are expected to be minimal considering the lower intensities of fire prescribed. Snags and downed logs would not be targeted for burning, but would not actively be protected. Prescribed fire may burn portions or whole snags or downed logs, however not all snags and downed logs would burn and more snags and downed logs may be created from burning of some individual trees or small clumps of trees (occasionally torching). There is not expected to be a substantial change in available large trees, snags and downed logs within the project area. Thinning and burning would likely create more of these features in the long-term to replace those that may be removed during project implementation.

Riparian habitat would be enhanced through project activities. The project would reduce conifer competition with riparian hardwoods allowing the riparian vegetation to expand, alder and willow growth might be stimulated through pruning, and native species might be planted in riparian areas. The project would also reduce the risk of catastrophic wildfire spread and thus provide a benefit by protecting the riparian habitat from wildfire that could remove large areas of riparian habitat. RMZs would protect the riparian areas during project treatments.

Prescribed burning would be implemented by one or a combination of hand-torches, ATV/UTVs and aerial ignitions. In many cases, suitable habitat is inaccessible via motorized travel, therefore aerial ignitions would likely be used with a smaller utilization of ATVs/UTVs for prescribed burning. This reduces soil disturbance from ATV/UTVs along with a reduced risk of weed introductions. Personnel would not be traversing the whole project area, but rather would mostly use areas with less steep slopes. While short-term noise and smoke disturbance is expected as a result of aerial ignitions, aircraft used would not remain stationary near occupied goshawk habitat or any portion of the project area and ignition would occur for a limited period of time each year, usually only a single day in unit, occasional a few days per unit. Therefore, additional effects from this method of ignition are discountable. Anticipated fire activity may include some moderate fire intensities with occasional single-tree or group touching occurring where ladder fuels are present. Some large diameter trees and logs could be consumed in areas of moderate fire intensity, however low intensity fires would primarily kill small trees less than 10-inches in diameter along with the smaller diameter dead and down fuels. Over most of the goshawk habitats, the overstory forest canopy would be retained with minimal modifications (created openings), even though individual trees and small patches may be burned. Thus, the amount of goshawk nesting and roosting habitat would not be substantially reduced. Prescribed fire activities would be implemented with an approved burn plan assuring firefighter safety and low to moderate intensity fire to mitigate potential resource impacts. Burning conditions and ignition patterns would limit the fires' rate of spread and consumption of downed woody materials. Burning of piled material and broadcast burning, along with leaving unburned areas and piles, may improve habitat for small mammal species (goshawk prey) by increasing the herbaceous understory.

The project would reduce the likelihood of degradation or loss of goshawk habitat from wildfire and should enhance key habitat components (e.g., creation of snags, logs, and herbaceous understory development). Some live trees would be killed by fire (mostly smaller trees), but this would not affect the ability of the habitat to support goshawk or reduce current habitat functionality. Short-term impacts would likely result in long-term benefits to the species through building habitat resilience to large, high severity wildfire and reducing high severity fire risk. Removal of small diameter trees would reduce tree competition, thus allowing the larger trees more growing space to expand in size (dbh, height and canopy).

As part of this project, a desired condition is to protect and promote old growth habitat. The areas that most closely meet the characteristics for old growth habitats, in general, are already managed for goshawks, such as post-fledgling areas (PFAs) and goshawk management areas (GMAs), along with MSO habitats. Managing these areas for goshawks would also promote old growth habitat as the areas

are managed to maintain features such as the largest trees, higher basal areas, more downed logs and snags, and denser canopy cover. Additionally, some areas with steep slopes would not be thinned. These areas may have old growth or have the potential to develop into such and thus would continue as old growth habitat or continue on their trajectories that may develop into old growth habitats. Burning which achieves low intensities and mosaic patterns is unlikely to change the old growth features.

The project would reduce the likelihood of degradation or loss of goshawk habitat from wildfire and should enhance key habitat components (e.g., creation of snags, logs, and herbaceous understory development). Some live trees would be killed by fire (mostly smaller trees), but this would not affect the ability of the habitat to support goshawks. Short-term habitat impacts would likely result in long-term benefits to the species through building habitat resilience to large high severity wildfire and reducing high severity fire risk. Removal of small diameter trees would reduce tree competition, thus allowing the larger trees more growing space to expand in size (dbh, height and canopy).

As described previously, 11% of the project area is on slopes greater than 60%. This means that at least 11% of the project area is less likely to be thinned or would likely have minimal hand-thinning, thus largely leaving the existing habitat in place. Additionally, 32% of the project area is on slopes between 40 and 60%, where mechanical thinning would not occur, thus reducing the disturbance level on 43% of the project area. Though goshawk habitats would be treated, large portions of goshawk habitat occur in or surrounding these steeper slopes and would either be left as currently existing, or only treated through prescribed fire which is not expected to remove goshawk habitat components, such as large trees, as the fires would be implemented at lower intensities. This maintains a mosaic of treated, lightly treated, and untreated areas, thus leaving a diversity of goshawk habitats throughout the Project and Analysis Area for goshawk to utilize during and after project implementation.

In addition to thinning and burning, a road is proposed to be closed to motorized vehicle use by the public. However, the private landowners who gain legal access to their property along that road would still be allowed to use it, along with Forest Service personnel, as needed. This is likely to greatly reduce the vehicle traffic on this road (79W), which passes through goshawk habitats. In areas which the road bisects goshawk habitats, goshawk would likely benefit from less vehicle traffic and thus less visual and noise disturbance. Additionally, less traffic on this road should improve adjacent stream water quality and riparian areas which it passes through. This could slightly indirectly benefit goshawk as the riparian areas provide habitat for goshawk and their prey.

As part of the proposed action, Forest Plan Amendments are proposed in order to meet the project objectives and to ensure the project proposed actions are following the current MSO Recovery Plan (2012) and best available science/management recommendations, such as for goshawks.

The Forest Plan Amendments would adopt aspects of the current MSO recovery plan (the existing Forest Plan includes the outdated MSO Recovery Plan (1995)), including to allow vegetation treatment that would benefit MSO and meet fuels objectives within MSO PACs, outside the nest/roost core, and during the breeding season. This could disturb goshawks during their breeding season if they are within the vicinity, however that risk would be minimized through the implementation of the project design features such as the requirement from the Forest Plan to survey for goshawks prior to treatments and the subsequent restrictions on treatments within occupied goshawk habitat during the breeding season. Allowing for treatments that would reduce the risk of catastrophic wildfire would provide a beneficial impact for goshawks by protecting and maintaining occupied and potentially suitable habitat into the future.

Another Forest Plan amendment clarifies the need for interspaces related to Goshawk habitat as recommended in RMRS-GTR-310 (Reynolds et al. 2013). This would provide for achieving northern



goshawk habitat objectives, which would benefit goshawk habitat by providing landscape level condition changes. The interspaces (spaces between trees, tree groups and tree clumps) contribute to “open canopy” character of frequent-fire forests. They often connect with other interspaces and thus are variably shaped and sized. This would contribute to a diversity of habitats available, from open areas, to dense clumps of trees, which would provide habitat for goshawks and their prey, such as nesting in dense clumps, but also foraging opportunities throughout the available habitats.

The Forest Plan Amendments are largely clarifications and simply shifts in language/wording to ensure the project follows the current MSO Recovery Plan, which would not negatively impact goshawk or other species. The Amendments that would change treatments, and thus impact goshawks, are largely designed to benefit goshawks.

### **Determination of Effects for Northern Goshawk**

Based upon the analysis of the proposed activities within the project and analysis area, the project **May Impact Individual or Habitat, but is not likely to contribute to a trend towards Federal listing or loss of viability to the populations or species.** This project is expected to have some potential short-term negative effects and some beneficial long-term effects to habitat.

## Sensitive Species Cumulative Effects

Cumulative effects consider future activities that are reasonably certain to occur within the action area of the Federal action subject to consultation.

Forest thinning and burning are reasonably foreseeable activities that may occur within the analysis area. Future Federal, city of Santa Fe, Tribal and State actions similar to the proposed action could likely occur throughout the Greater Santa Fe Fireshed Area and AA. Forest thinning and prescribed burning, if undertaken on Forest Service lands, would likely be designed to mitigate potential wildfire and, when possible, benefit sensitive species habitat. Forest thinning and prescribed burning on non-Forest Service land would largely be in areas that typically support habitat (e.g. pinyon-juniper in lower elevations) for fewer sensitive species or is on relatively smaller areas of land.

**Table 12. Actions Considered for Cumulative Impacts to Resources within the Santa Fe Mountains (SFM) Project Analysis Area.**

Action	Summary of Action	Cumulative Effects Related to Species
Pacheco Canyon Forest Resilience Project	<p>The scope of the project is to thin and use prescribe fire on approximately 2,042 acres northeast of the City of Santa Fe, near several popular recreation sites, including the Big Tesuque Campground, Aspen Vista Picnic Area, and the Santa Fe Ski Basin. Tesuque Pueblo lands are within and northeast of the project area. The purpose of the project is to change stand conditions in predominantly ponderosa pine forests in the Pacheco Canyon area. The actions proposed to accomplish this change would be thinning and burning about 2,042 acres.</p> <p>Decision signed on June 1, 2018.</p>	<p>The Pacheco Project was determined to have minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design.</p> <p>Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>
La Cueva Fuelbreak Project	<p>The purpose of the project is to change fire behavior in treated areas to reduce the risk of a large-scale, high intensity wildfire spreading to or from the communities of La Cueva, Dalton Canyon, and the Santa Fe Watershed. This project proposes creation of a shaded fuelbreak by thinning 995 acres and conducting prescribed burns (pile and broadcast burning) on approximately 1,100 acres.</p> <p>Decision signed on February 4, 2005</p>	<p>The La Cueva Project likely had minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design.</p> <p>Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>

Action	Summary of Action	Cumulative Effects Related to Species
County Line Fuel Wood Treatments	<p>The purpose of the project is to improve forest health and wildlife habitat through a combination of thinning and prescribed burning across approximately 900 acres on Borrego Mesa.</p> <p>Decision signed on August 6, 2010</p>	<p>The County Line Project for forest health and wildlife habitat would likely have minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design. Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>
Southern Rowe Mesa Restoration Project	<p>The purpose of this project is to promote a mosaic of healthy forest stands and natural grasslands through thinning and prescribed burning activities on approximately 17,500 acres on Rowe Mesa.</p> <p>Decision signed on February 21, 2013.</p>	<p>The Southern Rowe Mesa Project was determined to have minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design. Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>
Hyde Park Wildland Urban Interface Project	<p>The scope of the project is to thin and use prescribe fire on up to 1,840 acres. The project area is dominated by dense stands of ponderosa pine forests with a lesser component of mixed conifer and pinon-juniper. The project area is located in forests east of the community of Hyde Park Estates, near Hyde Memorial State Park, and adjacent to Black Canyon campground. The purpose of this project is to reduce the risk of uncharacteristic, stand-replacing wildfire and reduce the risk for insect and disease related tree mortality within the project area.</p> <p>Decision signed on March 21, 2018.</p>	<p>The Hyde Project was determined to have minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design. Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>
Santa Fe Municipal Watershed	<p>The scope of the project is to use a combination of tree thinning and prescribed burning on up to 7,270 acres of national forest and city lands in the Santa Fe Municipal Watershed. The proposal is designed to reduce the risk of a severe crown fire and to restore sustainable forest and watershed conditions in the Watershed.</p> <p>Record of Decision signed in October 2001.</p>	<p>The SF Watershed Project was determined to have minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design. Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>

Action	Summary of Action	Cumulative Effects Related to Species
<p>Santa Fe Municipal Watershed Pecos Wilderness Prescribed Burn Project</p>	<p>The project proposes to perform prescribed burns of between 200 and 2,100 acres at one time in ponderosa pine and mixed conifer stands within an approximately 2,900-acre, mid elevation (8,500 – 10,000 ft) treatment area within the Pecos Wilderness.</p> <p>Decision signed on April 28, 2015.</p>	<p>The SF Watershed Wilderness Burn Project would likely have minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design.</p> <p>Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>
<p>Rowe Mesa II (U.S. Forest Service n.d.)</p>	<p>Fuel treatment to promote a mosaic of healthy forests stands and natural grasslands by thinning and prescribed burning in pinon/juniper, and ponderosa pine trees that have encroached into the understory of woodlands and into meadows of Rowe Mesa.</p> <p>Project initiation 12/19/2018; expected implementation 4/2020.</p>	<p>The Rowe Mesa II Project on Rowe (Glorieta) Mesa does not yet have a developed proposed action enough to determine potential impacts, however, assuming it would follow Forest Plan requirements for all species (T&amp;E, Sensitive, MIS, etc.), it would likely be consider and protect those species through project IDFs, thus likely having minimal to no effects to species, including anticipated beneficial effects. Those treatments, in conjunction with the SFM proposed action, would move ecosystems of the area toward desired conditions including for wildlife habitats. Species and habitats would continue to be protected and/or improved as per the Forest Plan and Project design. Neither of these projects are anticipated to have substantial negative effects, largely only short-term, and would have longer-term positive effects. Thus, it is anticipated that there would be no contribution to cumulative effects for species.</p>
<p>Century Link/PNM Santa Fe to Los Alamos Fiber Optic Project (U.S. Forest Service n.d.)</p>	<p>Proposal to bury a fiber optic line along Forest Road 24 on Santa Fe National Forest land to a PNM transmission line where it will be carried to DOE facilities to improve service to Los Alamos National Lab and Los Alamos community.</p> <p>Notice of initiation 10/1/2018.</p>	<p>Project is beyond the analysis area for the SFM project. Potential impacts from each project are unlikely to overlap or be considered cumulative effects to species and their habitats.</p>
<p>Issuance of Forest-wide Temporary and Priority Special Use Permits (SUPs) for Non-Motorized Over-Snow Activities (U.S. Forest Service n.d.)</p>	<p>Proposal to approve issuance of temporary and priority SUPs for outfitter and guides throughout the Santa Fe National Forest to conduct guided recreation activities related to over-snow uses, including but not limited to cross country skiing and snow shoeing.</p> <p>Notice of initiation 12/1/2019.</p>	<p>Outfitter and Guide Permits are highly variable in scope. Most can be mitigated to reduce impacts to species and habitats. Therefore, many of these projects would not have considerable effects on species if they include mitigations or if they do not occur near species habitat or during breeding seasons. If they did though, then there could be an effect, however these permit activities are usually spread across the landscape and would generally not focus repeated impacts in a specific area.</p>

Action	Summary of Action	Cumulative Effects Related to Species
Rio Chama Aquatic and Wetland Habitat Restoration Project (U.S. Forest Service n.d.)	Species habitat improvement project to increase diversity and quality of aquatic habitat for fish and invertebrates in Rio Chama downstream from Abiquiu Dam approximately 5.6 miles between Santa Fe and Carson National Forests to point 1.34 miles upstream of Highway 84 bridge.  Notice of initiation 10/1/2019; expected implementation 4/2020.	Project is beyond the analysis area for the SFM project. Potential impacts from each project are unlikely to overlap or be considered cumulative effects to species and their habitats.
Comexico Jones Hill Exploration (U.S. Forest Service n.d.)	Exploratory drilling operation on unpatented mining claims in Pecos/Las Vegas Ranger District of SFNF. Proposal will cause approximately 5-7 acres of surface disturbance in an area that has been previously disturbed by earlier exploration date. All activities will occur within 1-3 year of the state date.  Scoping was conducted in December 2019; expected implementation 10/2021.	Project is beyond the analysis area for the SFM project. Potential impacts from each project are unlikely to overlap or be considered cumulative effects to species and their habitats. Both projects include mitigations to protect species and their habitats.
Pecos Bike Trails (U.S. Forest Service n.d.)	Project to develop trail system and impress access and promote visitor safety in Canada de Los Alamos/Glorieta area.  Notice of initiation 11/1/2019; expected implementation 2/2020.	Bike trails may slightly increase human presence near Sensitive species/goshawk habitats. Project mitigations may reduce this potential. The slight increase of human presence is unlikely to measurably alter Sensitive species/goshawk habitats or present disturbance to the species.
Pecos Rio Grande Cutthroat (RGCT) Trout Restoration (U.S. Forest Service n.d.)	Project to restore RGCT populations to Willow Creek and upper Cow Creek by adding 9 miles of stream to currently occupied distribution.  Scoping occurred February 2019.	Project is beyond the analysis area for the SFM project. Potential impacts from each project are unlikely to overlap or be considered cumulative effects to species and their habitats.
<b>Non-Forest Service Projects</b>		
Aztec Springs, Phase 2 & 3 (City of Santa Fe, The Nature Conservancy, New Mexico State Forestry)	150 acres of thinning, piling, and prescribed burning activities.	Project is likely similar to nearby planned FS projects, such as SFM project. Project likely complement each other in the protection of habitats from catastrophic wildfire. Projects likely have similar anticipated impacts to species, which are none or minimal, including some benefits. Projects are not anticipated to cumulatively exceed any negative impact thresholds for species and their habitats.
Aspen Ranch (Pueblo of Tesuque)	160 acres of thinning, piling, and prescribed burning activities in ponderosa pine and mixed conifer.	Project is likely similar to nearby planned FS projects, such as SFM project. Project likely complement each other in the protection of habitats from catastrophic wildfire. Projects likely have similar anticipated impacts to species, which are none or minimal, including some benefits. Projects are not anticipated to cumulatively exceed any negative impact thresholds for species and their habitats.

Action	Summary of Action	Cumulative Effects Related to Species
Vigil Grant (Pueblo of Tesuque)	158 acres of thinning, piling, and prescribed burning activities in ponderosa pine and mixed conifer.	Project is likely similar to nearby planned FS projects, such as SFM project. Project likely complement each other in the protection of habitats from catastrophic wildfire. Projects likely have similar anticipated impacts to species, which are none or minimal, including some benefits. Projects are not anticipated to cumulatively exceed any negative impact thresholds for species and their habitats.
Hyde Memorial State Park (New Mexico State Forestry)	Thinning, piling, and prescribed burning across 276 acres in Hyde Memorial State Park.	Project is likely similar to nearby planned FS projects, such as SFM project. Project likely complement each other in the protection of habitats from catastrophic wildfire. Projects likely have similar anticipated impacts to species, which are none or minimal, including some benefits. Projects are not anticipated to cumulatively exceed any negative impact thresholds for species and their habitats.
City of Santa Fe Planned Communities and Infrastructure Projects	<p>Three master planned communities that is projected to absorb most of Santa Fe’s growth through 2030</p> <ul style="list-style-type: none"> <li>• Tierra Contenta Master Plan (1995)</li> <li>• Las Soleras Master Plan (2008)</li> <li>• Northwest Quadrant (2010)</li> </ul> <p>Roadway improvements, trails and urban mixed use and parks (Southwest Activity Node, Las Soleras Park, and South Meadows Park) (City of Santa Fe 2017).</p> <p>Multiple drainage projects are proposed by City of Santa Fe in Council Districts 1, 2, 3, and 4 to be completed in three phases between 2019 and 2022 (City of Santa Fe n.d.).</p>	Project is beyond the analysis area for the SFM project. Potential impacts from each project are unlikely to overlap or be considered cumulative effects to species and their habitats.
Santa Fe River Greenway R&PP Lease Project	EA (released 11/21/19) for the conveyance of 23.5 acres of BLM-administered public lands to Santa Fe County under the Recreation and Public Purpose Act (R&PP) for the construction and maintenance of a short segment of the greenway and for bank stabilization of the Santa Fe River. The proposed project will create a greenway of public parks and multi-use recreational trails along the Santa Fe River from Two-mile Reservoir in eastern Santa Fe west to the Santa Fe County wastewater treatment plant, which is located just west of New Mexico Highway 599 (BLM 2019a).	Santa Fe Greenway project is unlikely to have negative impacts and cumulatively would improve and protect habitats (bank stabilization) adjacent to the SFM projects. With little to no negative impacts from these projects and the SFM project, it is not anticipated to cumulatively exceed any negative impact thresholds for species and their habitats.

Note: Projects that are listed as on hold in the January 2020 through March 2020 Schedule of Proposed Action (SOPA) were not included in this table.

The proposed project would have no adverse cumulative effects on sensitive species for the following reasons:

- A. The SFM project would follow Forest Plan requirements.
- B. The SFM project would implement Integrated Design Features that protect and improve species habitats
- C. This project would add to and magnify the beneficial effects to habitat through future forest restoration treatments.

Additionally, potential cumulative effects projects within the SFM analysis area are not likely to adversely affect MSO, but rather would likely protect and benefit them.

### **Determination of Cumulative Effects**

The proposed project would have no adverse cumulative effects because the proposed project would not adversely affect sensitive species and no known or reasonably foreseeable activities are proposed that would have adverse effects on sensitive species.

## MANAGEMENT INDICATOR SPECIES (MIS) EVALUATION

The Santa Fe National Forest Plan, adopted in 1987, and as amended in 1996 and 2004, identified eight Management Indicator Species (MIS). These species are Bighorn sheep, Rocky mountain elk, Mexican spotted owl, Merriam's turkey, Hairy woodpecker, Piñon Jay, Mourning Dove and the Rio Grande cutthroat trout.

These species were selected as MIS for reasons described in the Environmental Impact Statement, Santa Fe National Forest Plan, 1987. The objective was to select species that would indicate possible wildlife effects of changing plant communities and associated seral habitats. These species were selected for their association with plant communities or seral stages which management activities are expected to affect. Other factors considered in the selection of these species were monitoring feasibility, migratory habits and habitat versatility.

This project analysis considered the MIS list. Of the eight MIS designated in the Santa Fe National Forest Plan EIS, five species (Merriam's turkey, Hairy woodpecker, Piñon Jay, Spotted Owl and Mourning Dove) have some probability of occurring within the project limits. The remaining MIS were eliminated from evaluation in this document based upon lack of habitat within the analysis area. The habitat that each MIS represents is presented in the MIS table (Table 13).

**Table 13 – MIS designated for the Santa Fe National Forest**

Common Name	Scientific Name	Habitats Represented	Assessment Summary Related to Proposed Action Alternative
Merriam's Turkey	<i>Meleagris gallopavo</i>	Ponderosa pine zone that allows for grass, forb and mast producing vegetation to grow	Habitat and Species present in area, Proposed project work would not substantially remove or degrade habitat.
Piñon Jay	<i>Gymnorhinus cyanocephalus</i>	Foraging habitat and mast producing species in the Piñon juniper habitat type	Habitat and Species present in area, Proposed project work would not substantially remove or degrade habitat
Hairy Woodpecker	<i>Picoides villosus</i>	Mature forest habitat and snags	Habitat and Species present in area, Proposed project work would not substantially remove or degrade habitat
Mourning Dove	<i>Zenaida macroura</i>	Mid and low elevation grasslands, woodlands and Ponderosa pine habitat	Habitat and Species present in area, Proposed project work would not substantially remove or degrade habitat. See discussion below.
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Late seral stage mixed conifer	Habitat and Species present in area. Addressed in detail in BA. No further analysis.
Elk	<i>Cervis elaphus nelsoni</i>	Mid-elevation grasslands, meadows, and forested habitats	GIS indicates no potential habitat present in area, missing large open areas and largely unsuitable due to human activity and roads. Proposed project work would not substantially remove or degrade habitat. No further analysis.
Bighorn Sheep	<i>Ovis canadensis canadensis</i>	Alpine meadow habitat	Habitat and Species not present in Area, No further analysis.
Rio Grande Cutthroat Trout	<i>Oncorhynchus clarkii virginalis</i>	Represents riparian habitat and water quality	Addressed in Sensitive Species section of BE. Habitat and Species not present in Area, No further analysis.

Estimates of populations for MIS were evaluated from a number of sources for each species and then ranked into descriptive categories for the Santa Fe National Forest (Santa Fe National Forest



Management Indicator Species Assessment, 2003). Populations of MIS would be expected to fluctuate within a category from year to year. However, a species would not be expected to switch from category to category without some long-term change in environmental conditions. For instance, a change in ranking from uncommon to rare would be a cause for concern; and would warrant intensive evaluation of a species. A ranking system is based on the predicted number of breeding pairs; or adult females depending on which is most appropriate for the species addressed (Table 14).

**Table 14 – Ranking system for MIS evaluations**

CATEGORY	BREEDING PAIR/ADULT FEMALE
Not Present	0
Extremely Rare	1-10
Rare	10-100
Uncommon	100-1,000
Common	1,000-10,000
Abundant	10,000-100,000
Very Abundant	>100,000

**Table 15 – MIS habitat types in the Project Area**

MIS Common Name	MIS Habitat			Vegetation Type Represented	Veg Type Represented		
	MIS Habitat Acres across Forest (GIS)	MIS Habitat Acres across Project (GIS)	Project Percent (%) of Total Acres across the Forest		Vegetation Type Acres across Forest (Mid-Scale)	Approx. Veg Type Acres in the Project Area (ERU)	Project Percent (%) of Total Acres across the Forest
<b>Merriam's Turkey</b>	440,883	22,548	<b>5.11428202</b>	Ponderosa Pine	500,378	17,347	<b>3.46677911</b>
<b>Pinon Jay</b>	394,545	12,186	<b>3.08862107</b>	Piñon/Juniper	198,386	8,437	<b>4.25282026</b>
<b>Hairy Woodpecker</b>	854,987	33,657	<b>3.93655108</b>	Ponderosa Pine	500,378	17,347	<b>3.46677911</b>
<b>Mourning Dove</b>	986,543	35,481	<b>3.59649807</b>	Piñon /Juniper	198,386	8,437	<b>4.25282026</b>
				Ponderosa Pine	500,378	17,347	<b>3.46677911</b>

MIS use a variety of vegetation types together as their habitat. However, for the MIS assessments, the species represents a specific vegetation type. There are a couple of ways to consider this as shown in Table 15 above. For this assessment, the species are considered based on their habitat (a combination of vegetation types) and by the vegetation type they are tied to as MIS. In both scenarios, the project area generally represents about 4% of the habitat or vegetation type that the MIS is associated with. The highest was for turkey, with the project representing 5% of the habitat found across the Forest. This indicates that the project area for all of these MIS, only represents a small portion of the habitat available to the species across the Forest. With this in mind, even if the project presented drastic negative impacts, it would not measurably impact the species population across the Forest, nor the bioregion. However, the project is anticipated to be neutral or provide benefits to these species with potential negative impacts likely immeasurable.

The MIS with habitat present in the project are expected to benefit or experience no change from the proposed action. Perennial water is present but cutthroats are not known in the area. Bighorns are not known in the area as the project does not provide alpine meadows and is mostly heavily forested. Mexican Spotted Owls have been analyzed in detail in the BA (project record), so are not analyzed again here.

New herbaceous plant and shrub growth of mountain mahogany and oak, and acorn production could benefit mourning dove, wild turkey and elk as food sources. Hairy woodpecker habitat would not be changed because snags and large trees would be retained and recruitment would continue.

Common to all species, the closing of road 79W to the public would reduce human-vehicle-wildlife interactions. Traffic can create a barrier to wildlife movement, and reducing the amount of traffic on that road would likely allow MIS to use the surrounding areas with less disruption. It would also reduce riparian impacts as all species benefit from water and riparian resources. Additionally, less traffic leads to fewer opportunities for vehicles to bring weed seeds to the area and transport weeds already in the area. This would help to maintain the local native plant populations of all habitat types that are important to all wildlife species, including MIS.

As part of the proposed action, Forest Plan Amendments are needed in order to meet the project objectives and to ensure the project proposed actions are following the current MSO Recovery Plan (2012) and best available science/management recommendations, such as for goshawks. The Forest Plan Amendments are largely clarifications and simply shifts in language/wording to ensure the project follows the current MSO Recovery Plan, which would not negatively impact MIS. The Amendments that would change treatments, would result in a diversity of habitats available, thus would present a benefit MIS in the project analysis area.

The appendices include management guidelines that would protect and improve habitat for MIS. The Mexican Spotted Owl protection measures are designed for the owl, but would also provide habitat for some MIS. Additionally, the IDFs in the appendices are designed to maintain habitat features, such as snags and downed logs, promoting stand diversity such as openings, while also leaving some dense tree groups. All the IDFs work together to help protect and improve habitats for multiple species across the numerous habitats found in the project area. For example, IDFs that protect the soil and subsequently promote healthy native vegetation, would maintain browse and forage for turkey and elk, or IDFs that dictate how prescribed burning would occur in order to have lower impacts to soil and vegetation, would maintain forage and browse for turkey and elk. IDFs that reduce weed spread would maintain native plant assemblages in which again provide forage and browse, and also native seed sources for dove. Leave No Trace practices would minimize the risk of entanglement, entrapment and choking hazards to all species. IDFs that protect riparian areas would maintain riparian species, riparian diversity, riparian function and water quality, which all provide habitat to all species. Leave-islands would provide habitat diversity for species such as pinyon jay. Promoting hardwoods, like Scouler's willow and oak would provide diversity, also food for turkeys. The IDFs work together to maintain and protect habitats all MIS. The understanding that all of the IDFs would be implemented leads to a lower effects determination by minimizing the potential for negative direct and indirect impacts and subsequent population impacts.

## **Merriam's Turkey (*Meleagris gallopavo*)**

### ***AFFECTED HABITAT DESCRIPTION***

The Merriam's turkey is the most common subspecies of turkey. It is found in many mountainous areas of northern New Mexico. The bird utilizes ponderosa pine, a source of mast and its favorite roosting tree. The ponderosa pine is an essential component of its permanent habitat, while surface water is a requirement. Turkeys prefer to roost in tall mature or over-mature ponderosa pines with relatively open crowns and large horizontal branches starting at 20 to 30 feet from the ground. Trees with a diameter at breast height (DBH) of over 14 inches are used as roosts. These trees usually have excellent protection from the wind, and must be located in sites with an open ridge or rocky ledge nearby to provide ease in entering and exiting the roost site. Hens normally nest within ½ mile radius of water.

A healthy ponderosa pine understory provides the turkey cover, as well as forage. Turkeys forage in grasslands, brush communities, deciduous tree-brush and in ponderosa pine. They eat grasses and grasshoppers in the summer. They eat oak supply mast and mature ponderosa pine seeds in fall. Tall grasses are eaten in the winter when the heavy snows come. The Project area generally has low quality habitat for the Merriam's turkey due to the lack of herbaceous understory.

### ***ANALYSIS OF EFFECTS***

The thinning and prescribed burn treatments should have a beneficial effect on habitat for turkey. These treatments would create diversity in the understory of the forest, allowing for herbaceous vegetation to increase, thus increased forage opportunities for turkey. Although there could be some temporary and minor disturbance to individual turkeys, causing them to move away from the disturbance for a short period, this would not negatively affect their ability to reproduce or survive, as there is suitable habitat surrounding the project in which they could utilize and not all habitat in the project area would be treated at once. Additionally, the project would also leave some slash piles to provide habitat for turkeys, as per the Forest Plan and the IDFs. Impacts would be lessened if treatments are implemented outside of the breeding season. Turkeys are very mobile, so potential negative effects are minor and would not impact the population nor contribute to a downward trend in the population.

### ***POPULATION ANALYSIS***

Turkeys are very wary, secretive, and avoid contact with people. The turkey population on the Santa Fe National Forest is ranked as common (1,000-10,000 individuals). This population would fluctuate from year to year based on various environmental conditions and hunter success; and would not be expected to change as a result of project activity. The population trend on the Forest has been rated as stable or increasing. Populations in the project area are expected to follow this same general trend.

### ***EFFECTS DETERMINATION***

This project is likely to have no negative impacts on the overall population trends for turkeys in the project area. The potential for incidental loss of a turkey nest would not likely be measurable above the normal population fluctuations that occur from year to year. Implementation of this project is not likely to measurably influence the status or trend of this species.

## **Piñon Jay (*Gymnorhinus cyanocephalus*)**

### ***AFFECTED HABITAT DESCRIPTION***

Piñon jays nest mainly in stands of piñon-juniper. They need open woodlands for nesting and an adequate supply of seeds, especially nuts (Terres 1980). They are gregarious and breed in colonies up to 150. They spend the winters in large flocks of 10's or 1,000's moving in search of piñon stands with a successful crop of piñon nuts that are a primary food source along with other seeds, fruits and insects.

Stands of piñon-juniper provide habitat for piñon jay in the project area. This area would not be a main focus of the treatments, as it makes up about 16% of the project area. Less than half of that is proposed for treatments, leaving more than half for the needs of the jay.

### ***ANALYSIS OF EFFECTS***

Nesting habitat of the piñon jays would not be affected. Although there could be some temporary and minor disturbance effects to individual piñon jays, causing them to move away from the disturbance for a short period of time, this would not negatively affect their ability to reproduce or survive, as there would be similar available habitat throughout and outside of the project area. Additionally, design features would consider and protect potential nesting areas, such as “treatments would be implemented to promote pinyon jay habitat” and maintaining at least 15% of the mast-producing pinyon stands (IDF-Wild-13). Potential negative effects would be minor and temporary disturbance, and would not impact the population nor contribute to a downward trend in the population.

### ***POPULATION ANALYSIS***

Piñon jay nesting populations are stable or decreasing based on Breeding Bird Surveys in New Mexico. The species occupies New Mexico as a breeding and winter resident. The piñon jay on the Santa Fe National Forest would be ranked as common (1,000-10,000). This project area has limited acres in the piñon-juniper type. Piñon jays are variably residents in mainly middle elevation areas containing piñon-juniper woodlands almost statewide, and are considered uncommon to locally abundant. Even within these habitats, however, their occurrence may be very unpredictable and seasonally sporadic. In mass movements during years of poor seed crop especially piñon nuts, flocks may move hundreds of miles. Due to the unpredictable movements of these birds, population estimates for project level analysis is not possible.

### ***EFFECTS DETERMINATION***

This project is likely to have no impacts on the Piñon jay populations in the project area because the project only proposes to treat less than half of the suitable habitat and the project would aim to protect nesting jays if they are observed, along with improve habitats by reducing tree competition and minimizing the risk of wildfire spread. The effects of the project are not likely to be measurable or above the normal population fluctuations that occur both seasonally and from year to year. Implementation of this project is not likely to measurably influence the status or trend of this species.

## **Hairy Woodpecker (*Picoides villosus*)**

### ***PREFERRED HABITAT DESCRIPTION***

The hairy woodpecker is an indicator species for the presence of snags and down logs. The species is a forest generalist, keying in on available snags and live aspen. Nests are primarily in trees averaging 17 inch DBH and approximately 60 feet high. It forages primarily on tree trunks averaging 17 inch DBH and >30 feet high. Down logs are important to support insect populations for foraging. Large trees, which are future down logs and snags, are maintained across the Santa Fe National Forest in accordance with the Forest Plan and the background matrix of current snags and down logs. Snags and down woody debris comprise an important element to the background matrix of the forested landscape. The habitat trend for Hairy woodpecker is considered stable for the Forest.

### ***AFFECTED HABITAT CONDITION***

The project area is comprised predominately of ponderosa pine forest with inclusions of aspen, and mixed conifer. Trees (live and dead) in the project area are large enough in diameter to be used by this species. Snags and down logs within the project area have increased due to mortality from the Douglas fir beetle and drought conditions over recent years.

### ***ANALYSIS OF EFFECTS***

This project does not propose to cut trees larger than 16 inches dbh. A low potential for incidental loss of a cavity nest tree exists because large trees would be not be thinned, snags would only be felled if a safety hazard, and such snags would be left on the ground to contribute to downed logs. Trees with nest cavities would be avoided during thinning, not cut and would not be targeted for burning. Burning might incidentally remove an insubstantial number of existing snags, and would also potentially be replaced by new snags created during burning, therefore no negative effects to woodpeckers are expected.

### ***POPULATION ANALYSIS***

The Hairy woodpecker population is ranked as abundant for the Santa Fe NF. This means that the estimated number of breeding pairs ranges between 10,000 and 100,000. The population of hairy woodpeckers is considered stable to increasing on the Santa Fe National Forest based on the trends seen within the State of New Mexico, observations on breeding bird surveys in or adjacent to the Forest and habitat conditions within the Forest.

### ***EFFECTS DETERMINATION***

This project is expected to have no effect to the overall population trend for hairy woodpecker on the Santa Fe National Forest. Implementation of this project is not likely to measurably influence the status or trend of this species.

## **Mourning Dove (*Zenaida macroura*)**

### ***AFFECTED HABITAT DESCRIPTION***

Mourning Dove are found across North America in many types of habitat including most forest types. They are widespread except in the Arctic and closed forests. It is abundant and increasing near farms and suburbs. It frequents backyard feeders, suburbs and towns. They are common to abundant in most counties in New Mexico.

Throughout the Santa Fe National Forest, Mourning dove habitat is abundant and the project area provides suitable habitat for the Mourning dove. This species is primarily found in lower elevations of the Forest, however, they are found in Douglas-fir, ponderosa pine, spruce-fir, aspen, and piñon-juniper forest types. Coniferous trees and ground sites are preferred early in the year before deciduous trees have developed leaves. In all situations however, abundant food and water must be available within 20-30 km. These habitats and grassland habitats found on the Forest meet the feeding requirements for the Mourning dove. Water developments and under burning in ponderosa create favorable feeding areas. The abundance of nesting and cover opportunities on the Santa Fe contribute to maintaining viable populations of Mourning dove.

### ***ANALYSIS OF EFFECTS***

Thinning and small openings would promote grasses and forbs that produce seed for foraging, which could benefit the species. Although there could be some temporary and minor disturbance effects to individual doves, causing them to move away from the disturbance for a short period of time, such would not negatively affect the overall population's ability to reproduce or survive, as there is suitable habitat surrounding the project in which they could utilize and because treatments would not occur on the entire project at once. Additionally, there are IDFs that would provide protections to nests if observed and to burn in a mosaic manner to provide diversity such as cover and openings for species such as this (IDF- Wild-2, 23).

### ***POPULATION ANALYSIS***

Mourning Dove nesting populations are stable or decreasing based on Breeding Bird Surveys in New Mexico. This species occupies New Mexico as breeding resident and can be found year round in the southern counties. No threats to the mourning Dove are known except for human encroachment or over hunting. On the Santa Fe National Forest, the Mourning dove would rank as common (1,000-10,000). The New Mexico Natural Heritage Program ranked populations of Mourning Dove in New Mexico as "Demonstrably Secure" in October 1997. It is a multiple brooder and the most abundant dove in North America and the most widely hunted and harvested game bird. Natural mortality factors include predation of adults and free-flying young by avian and mammalian predators and destruction of eggs and nestlings.

### ***EFFECTS DETERMINATION***

This project is likely to have no negative impacts on the overall population trends for mourning dove in the project area. The potential for incidental loss of a mourning dove nest would not likely be measurable above the normal population fluctuations that occur from year to year. Implementation of this project is not likely to measurably influence the status or trend of this species. Habitat quantity would not change but the change in quality would be beneficial to dove habitat. Implementation of this project is not likely to measurably influence the status or trend of this species.

## Determination of Effects to MIS

Habitat suitable for the MIS would not be substantially altered or removed by the proposed project and would be enhanced. Project activities would not cause disturbances significantly greater than current human activities in the project area.

Activities associated with the proposed project would **not result in a downward population or habitat trend for Management Indicator Species** or their habitats.

## Cumulative Effects to MIS

Several similar vegetation projects have occurred and are planned to continue to occur near the project area that have similar effects to wildlife habitat. See the cumulative effects project table above in the Sensitive Species section for a list of anticipated projects in the project analysis area. These projects would provide similar impacts to MIS, as for Sensitive species discussed in that table, which are largely immeasurable impacts or potentially beneficial impacts. The additional benefits of past and foreseeable future projects, such as thinning, would be to reduce the risk of crown fires across a larger area, thus protecting and maintaining MIS habitats. Habitat changes would also be beneficial in the treated areas as a diversity of habitats would be available post-treatments.

No negative cumulative effects are expected to any MIS from this project proposal in conjunction with anticipated projects in the analysis area.

## MIGRATORY BIRDS

All migratory birds native to the United States are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918. On January 10, 2001, President Clinton signed Executive Order 13186 placing emphasis on conservation of migratory birds. The Forest Service's Southwest Region currently analyzes impacts to migratory birds by addressing the following:

- 1) effects to high priority birds categorized as "Species Conservation Level 1" as identified by New Mexico Avian Conservation Partners (NMACP) (2013),
- 2) effects to Important Bird Areas (IBAs), and
- 3) effects to Overwintering Areas.

NMACP (formerly New Mexico Partners in Flight) considers eight risk factors in identifying conservation priority species: Breeding Distribution, Non-breeding Distribution, Breeding Season Threats, Non-breeding Season Threats, Breeding Season Threats in New Mexico, Importance of New Mexico to Breeding, Population Size, and Local Population Size. Species with the highest risk factors are classified as "Species Conservation Level 1" (SC1). This evaluation addresses general effects to migratory birds and specific effects to SC1 species for the main habitat types found in the project area.

Species with the highest risk factors are classified as "highest priority" for conservation action. This evaluation addresses general effects to migratory birds. Specific effects to highest priority species for the main habitats are found in Table 16, which displays habitats and species that may occur in the Project.

Habitats used by migratory birds range widely from early to late successional stages, from prairie to forest. Migratory birds use these areas for feeding, roosting, and nesting. This project area provides habitat components used by some migratory birds.

The project area is largely mixed conifer and ponderosa pine with understory of seedlings/saplings and pole-sized white fir and Douglas fir, with brush species such as Mountain mahogany and shrubby Gambel oak and pinon-juniper in the lower elevations.

Woody material in the form of fallen trees and large limbs is present throughout the area. Migratory bird species would experience conditions moderately changed toward more favorable under the proposed action. Smaller woody material would be consumed during burning which would provide an improvement by allowing understory vegetation growth, thus providing increases in foraging opportunities for birds that feed on seeds and insects. Some larger woody material would be consumed during burning, but would likely be replaced as some larger trees die and snags fall, either through natural processes or as a result of burning. The creation of snags would provide and increase in insects and cavities for nests.

Impacts from noise and visual disturbance would occur, but would be temporary and in relatively short duration as work moves across the landscape, not treating the whole area at once, thus allowing refuge away from the treatment areas. Impacts would be minimized further if treatments occur largely outside of the breeding season, when possible. Habitat would benefit or the effect would be neutral to species using the area, as the treatments are expected to promote habitat diversity and reduction of risk of habitat loss from catastrophic wildfire.

Range-wide concern about high priority species stem mostly from possible loss of snags, and the effects to habitat from fire suppression, or effects of commercial thinning (logging). Thinning as



proposed in this project is not commercial logging. The proposed thinning would not remove snags or large trees except for rare cases where they present a direct hazard to workers in the area or restrict equipment movement in a way to cause a safety hazard. Snags would likely be created by the proposed prescribed burning. Thinning would enable prescribed fire to maintain the ecological processes as part of this landscape.

Individual nests or specific nesting areas are not known in the project area, however, some are likely to occur. According to the IDFs that would be implemented as part of the proposed actions, if a nest is discovered during thinning, it would be avoided and left in place (IDF- Wild 23-26). Additionally, IDFs recommend protections for habitat features such as snags, logs and diversity. Implementation is likely to occur largely outside of the breeding season, however, it may occur during breeding season and therefore may directly affect birds through disturbance, mortality or damage of nests. Prescribed burning may damage some nests or nest trees/bushes/shrubs in the area, however, nests would not be targeted for removal and nests would remain unharmed by project treatments in the surrounding landscape and within non-treatment areas (leave-islands and other untreated areas) within the project, therefore continuing to provide sufficient opportunities for migratory birds to maintain their current populations and trends.

No substantial adverse effects would occur to Migratory Birds and the proposed actions would improve habitat conditions over the long term by restoring ecological diversity of vegetation composition and structure by reducing the number of trees per acre, promoting variable age class structure. Potential negative impacts would be of short duration and across relatively small areas each year, not all at once.

Treatments would be designed and planned with consideration for breeding birds to minimize the potential for cumulative effects. For example, if work were to occur during the breeding season, depending on the species and vegetation types, strategic planning could allow for treatments to occur in a staggered manner, not thinning/burning entire watersheds at once, such as treating less than 1/3 of the National Forest System Lands in each specific HUC 12 watershed in a given year, thus leaving at least 2/3 of the area for nesting and recruitment to continue without project disturbance, maintaining bird populations and trends.

Executive Order 13186 requires the disclosure of unintentional take reasonably attributable to proposed actions that could have a negative effect on migratory bird populations, with emphasis on priority species. Unintentional (i.e. that is not the purpose of the activity) take (i.e. killing of birds, young, or eggs) is not prohibited under the act or executive order. Disturbance, disruption or the modification of habitat is not considered as unintentional take under the MBTA and MOU.

The proposed project activities do not require a USFWS MBTA permit.

The appendices of this BE include management guidelines (IDFs) that would protect and improve habitat for migratory birds. The Mexican Spotted Owl protection measures are designed for the owl, but would also provide habitat for other migratory birds. Protections for MSO and goshawk, such as breeding season restrictions, would benefit breeding migratory birds in proximity to MSO and goshawk habitats. Additionally, the IDFs in the appendices are designed to maintain habitat features, such as snags and downed logs, while also promoting stand diversity such as openings but also leaving some dense tree groups. The IDFs would be implemented as part of the proposed action.

New Mexico State Partners in Flight lists priority species of concern by vegetation type. This analysis reflects a review of species of Highest Priority for vegetation types found in this project area. This review is displayed in Table 16.

**Table 16 – Migratory Bird species that may occur in or near the project area.**

Veg type	Species	Habitat	Project Habitat Impacts	Disturbance Effects
Piñon-juniper	Black-throated gray warbler	Piñon juniper, mostly in piñon for nesting. Habitat quality was reduced due to high piñon mortality from beetle kill and drought.	New and young trees would remain available. Trees and stands would be healthier over the long term.	See discussion in sections above.  Temporary during implementation. No disturbance if action takes place after July.
	Gray vireo	See Threatened, Endangered & Sensitive (TES) write-ups	See TES write-ups	Nests would be protected or not actively removed/damaged.
Ponderosa pine	N. goshawk	See TES write-ups	See TES write-ups	
	Mexican spotted owl	See TES write-ups	See TES write-ups	
	Flammulated owl	Large snags in or near open areas. Low number of snags in area but they would not be targeted for removal.	Snags would be protected per direction except for hazard trees. New snags may be created through Rx burns.	
	Virginia's warbler	Nests on ground in a variety of understory species and high litter cover. Gambel oak shrub preferred.	Oak, small trees, shrubs, brush and grasses would benefit from a more open understory.	
	Grace's warbler	Pine specialist. Gleans insects from large trees. Prefers open forest with mature, tall trees.	Mature/large green trees would be retained in the area. Younger age classes would benefit from decreased competition. Reduced understory meets open forest preference.	

Other species from the NMACP list were not included here because they either have already been addressed in other sections, they are not known in the project area or their range does not include the Santa Fe National Forest (e.g. Greater pewee and Olive warbler).

## Important Bird Areas

There is no designated Important Bird Area (IBA) affected by the project. The IBAs on the Santa Fe National Forest are the Chama River Gorge and the Caja del Rio including the Santa Fe River Canyon below the Caja del Rio on both BLM and FS lands. There is no association or important link between the bird communities within the project area and these IBAs; therefore, no IBAs are affected by the project.

## Overwintering Areas

Many important overwintering areas are large wetlands. Important overwintering areas recognized on the Forest include the Pecos River, the Rio Chama and Rio Grande corridor. The Project area is not recognized as an important over-wintering area because significant concentrations of birds do not occur here nor do unique or a high diversity of birds winter here. Although the project is not located in one of these recognized overwintering areas, ample alternative overwintering habitat is available for birds throughout the project watersheds. The proposed project does not include the removal of large trees or snags, nor does it include the destruction of other overwintering habitat for birds. Long-term post-treatment overwintering habitat is expected to be improved by the proposed project with the improvement of habitat diversity.

## CORRIDORS

Wildlife connectivity is important to the sustainability of numerous species. Not much is known about the wildlife movements across the project landscape and the relation to surrounding and adjacent landscapes. This project provides an opportunity to consider how the landscape may provide corridors for wildlife to move between areas of suitable habitat. Even without a full understanding of these wildlife movements, the project can be designed and implemented in a way that would provide corridor options for wildlife, should they need them.

In some cases, such as with the American marten, which migrates elevationally with the seasons, leave-islands could be strategically placed to allow passage through more open stands, considering that the marten could be vulnerable away from cover. Leave-islands could be staggered to connect with other areas that have not been treated (like steep slopes) or to connect to adjacent habitat patches (IDFs-Wild 8, 12).

In the southern part of the project area, it is known to be a corridor for mule deer (Appendix D Map). With this knowledge, project implementation can consider their potential routes as they come and go from the Forest. In doing so, treatments could be broken up along roads and boundaries so that there are not long continuous swaths of open areas that bisect their potential routes. Leave-islands could be staggered or screening could be left along roads. These types of considerations could provide the deer with more cover as they move across the landscape, protecting them from predators and hunters.

Additionally, an effort is being made across NM to improve wildlife connectivity across major roads, such as Interstate 25 along the project's southern boundary. As the project progresses, the Forest Service, NM Department of Game and Fish, and the NM Department of Transportation, have an opportunity to consider thinning treatments that might encourage wildlife, such as deer, to certain areas where road crossings may be safer for wildlife and motorists.

A project IDF (Wild-12) has been incorporated into this project to encourage improving habitat corridors for wildlife species in the area. There is no requirement to do so, nor to analyze the impacts, however, managers see this opportunity as the project is planned and implemented in areas where corridor

planning could be beneficial to both wildlife and humans. Considering and implementing wildlife corridors would benefit wildlife by maintaining connections between populations, which helps to keep populations viable and allows wildlife to use a wider range of available habitats across a larger landscape.

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Steve Romero, District Ranger  
Enterprise Teams, Surveys  
Heidi Klingel, Hydrology  
Dave Isackson, Fuels  
Jennifer Clayton, SWCA  
Coleman Burnett, SWCA

## REFERENCES

- Arizona Willow Interagency Technical Team (AWITT). 1995. Arizona willow conservation agreement and strategy. U.S. Forest Service, Intermountain Region, Ogden, UT; U.S. Forest Service, Southwest Region, Albuquerque, NM; National Park Service, Rocky Mountain Region, Denver, CO; U.S. Fish and Wildlife Service, Mountain-Prairie Region, Salt Lake City, UT; U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, NM.
- Barlow, J. C., S. N. Leckie, and C. T. Baril (Barlow et al). 1999. Gray Vireo (*Vireo vicinior*). In *The Birds of North America*, No. 447 (A. Poole and F. Gill, eds.). In *The Birds of North America*, Inc., Philadelphia, PA.
- Behnke, R.J. and M. Zarn. 2002. *Trout and Salmon of North America*. First Edition. The Free Press, New York, New York, USA.
- Braun, C. E., K. Martin, and L.A. Robb (Braun et al). 1993. White-tailed Ptarmigan (*Lagopus leucura*). In *The Birds of North America*, No. 68 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Science; Washington, D.C.: The American Ornithologists' Union.
- Coleman, R.A. 2002. *The Wild Orchids of Arizona and New Mexico*. Cornell University Press, Ithaca, NY. 248p
- Decker, K. 2006. *Asclepias uncialis* Green (wheel milkweed): a technical conservation assessment. [Online] USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/asclepiasuncialis.pdf>
- Decker, Karin. 2006. *Salix arizonica* Dorn (Arizona willow): A technical Conservation Assessment, Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation project. Colorado Natural Heritage Program. Colorado State University. Fort Collins, CO.
- Degenhardt, William, C. Painter, A. Price. 1996. *Amphibians and Reptiles of New Mexico*. University of New Mexico Press, Albuquerque, New Mexico.
- Dick-Peddie, W. A. 1993. *New Mexico Vegetation: past, present, & future*, with contributions by W.H. Moir and Richard Spellenberg, published by the University of New Mexico Press, Albuquerque.
- Drummond, R.A. and T.D. McKinney. 1965. Predicting the recruitment of cutthroat fry in Trapper's Lake, Colorado. *Transactions of the American Fisheries Society* 94:389-393.
- Findley, J.S., A.H. Harris, D.E. Wilson, and C. Jones. 1975. *Mammals of New Mexico*. University of New Mexico Press, Albuquerque, New Mexico. xxii + 360 pp.
- Fitzgerald, J. P., C. A. Meaney, and D. M. Armstrong. 1994. *Mammals of Colorado*. Denver Museum of Natural History and University Press of Colorado, 467 pp.
- Harig, A.L. and K.D. Fausch. 1999. Minimum habitat requirements for establishing translocated cutthroat trout populations. Annual Progress Report to Colorado Division of Wildlife, U.S. Forest Service and Trout Unlimited. 90pp.
- Harig, A.L and K.D. Fausch. 2000. Factors influencing success of cutthroat trout translocations. Final Project Report to Colorado Division of Wildlife, U.S. Forest Service and Trout Unlimited. 140 pp.
- Hoffman, R.W. 2006. White-tailed Ptarmigan (*Lagopus leucura*): at technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/whitetailedptarmigan/pdf>

- Huntly, N.J. 1987. Influence of refuging consumers (Pika: *Ochotona princeps*) on subalpine meadow vegetation. *Ecology* 68: 274-283.
- Huntly, N.J., Smith, A.T. and Ivins, B.L. 1986. Foraging behavior of the pika (*Ochotona princeps*), with comparisons of grazing versus haying. *J. Mammal.* 67: 139-148
- Idaho Department of Fish and Game (IDFG). 1995. Habitat conservation assessment and conservation strategy for the Townsend's big-eared bat. Idaho State Conservation Effort (ISCE). Draft unpubl. Rep. No. 1; Idaho Dept. of Fish and Game, Boise, Idaho. 63p
- Irving, R.B. 1954. Ecology of the cutthroat trout in Henry's Lake, Idaho. *Transactions of the American Fisheries Society* 84:275-296.
- Johnson, Douglas H., Lawrence D. Igl, and Jill A. Dechant Shaffer (Series Coordinators). 2004. Effects of management practices on grassland birds. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/literatr/grasbird/index.htm> (Version 12AUG2004).
- Kamees, L., T. Mitchusson, M. Gruber. 2008. New Mexico's Quail Biology, distribution, and Management Recommendations. New Mexico Department of Game and Fish. Available electronically at <http://www.wildlife.state.nm.us/publications/documents/QuailHabitat.pdf>.
- Kennedy, P.L., J.M. Ward, G.A. Rinker, and J.A. Gessaman. 1994. Post fledgling family areas in Northern Goshawk home ranges. *Stud. Avian Biol.* 16:75-82. Kennedy, P. L. 2003. Northern goshawk (*Accipiter gentilis atricapillus*): a technical conservation assessment. Unpublished report, USDA Forest Service, Rocky Mountain Region, Species Conservation Project, Denver, Colorado, USA.
- Kershaw, Linda, A. MacKinnin, and J. Pojar. *Plants of the Rocky Mountains*. 1998. Lone Pine Publishing, Edmonton, AB, Canada.
- Lightfoot, K. and R. Sivinski. 1994. Status report on *Scrophularia macrantha* Greene ex Stiefelhagen. New Mexico State Forestry and Resources Conservation Division, Santa Fe.
- Magee, J.P., T.E. McMahon and R.F. Thurow. 1996. Spatial variation in spawning habitat of cutthroat trout in a sediment-rich basin. *Transactions of the American Fisheries Society* 125:768-779.
- Mergen, D.E. 2006. *Cypripedium parviflorum* Salisb. (lesser yellow lady's slipper): a technical conservation assessment. [Online] USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/cypripediumparviflorum.pdf>
- National Geographic Society. 1987. *Field Guide to the Birds of North America*. Library of Congress. 480 pp.
- NatureServe. NatureServe Explorer: An online encyclopedia of life [web application]. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>.
- Nekola, J.C. and B.F. Coles. 2010. Pupillid land snails of eastern North America. *American Malacological Bulletin* 28:29-57.
- New Mexico Avian Conservation Partners. 2020. Species Assessment Scores website, <http://avianconservationpartners-nm.org/>.
- New Mexico Avian Conservation Partners. 2016. Species Accounts website, <http://www.nmpartnersinflight.org/species.html>
- New Mexico Bat Working Group. 2007. Draft New Mexico Bat Conservation Plan. Available: <http://www.geocities.com/nmbwg>

- New Mexico Department of Game and Fish. BISON-M (Biota Information System of New Mexico): Biological database for New Mexico. NMDGF in cooperation with USDI BLM, USDI FWS, USDI Bureau of Reclamation, US Army Corps of Engineers, USDA Forest Service and University of New Mexico. <http://nmnhp.unm.edu/bisonm/bisonquery.php>
- New Mexico Department of Game and Fish. 2002. Long-Range Management Plan for the Conservation of Rio Grande Cutthroat Trout. Santa Fe, New Mexico.
- New Mexico Department of Game and Fish (NMDGF). 2006. Status Report and Biological Review of the Gray Vireo in New Mexico. Authors, John P. DeLong and Sartor O. Williams III. New Mexico Department of Game and Fish, Santa Fe, New Mexico. 30p
- New Mexico Department of Game and Fish (NMDGF). 2007. Gray vireo (*Vireo vicinior*) recovery plan. New Mexico Department of Game and Fish, Conservation Services Division, Santa Fe, New Mexico. 30p
- New Mexico Department of Game and Fish. 2008-2011. New Mexico Hunter Harvest Report Program. Furbearer Summary of Results. Available online at <http://www.wildlife.state.nm.us/recreation/hunting/harvest/documents/2011-12Furbearer.pdf>.
- New Mexico Natural Heritage. Organism and Ecosystem website, <http://nhnm.unm.edu/botany/index.html>
- New Mexico Natural Heritage. Botany website, <http://nhnm.unm.edu/botany/index.html>
- New Mexico Partners in Flight (NMPiF). 2007. New Mexico Bird Conservation Plan Version 2.1. C. Rustay and S. Norris, compilers. Albuquerque, New Mexico.
- New Mexico Rare Plant Technical Council (NMRPTC). 1999. New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page. <http://nmrareplants.unm.edu>
- New Mexico State University. 2009. Mule Deer in New Mexico Guide L-301. Cooperative Extension Service. College of Agricultural, consumer and Environmental Sciences. Las Cruces, New Mexico. Available electronically at [http://aces.nmsu.edu/pubs/\\_l/L-301.pdf](http://aces.nmsu.edu/pubs/_l/L-301.pdf)
- Nowak, Ronald M. 1994. Walker's Bats of the World. John Hopkins University Press. Baltimore, MD.
- Perkins, J. M., and T. Schommer. 1992. Survey protocol and an interim species conservation strategy for *Plecotus townsendii* in the Blue Mountains of Oregon and Washington. U.S. Dept. Of Agriculture, Forest Service. Pacific Northwest Region, Wallowa Whitman National Forest, Baker City, Oregon. December. 23p
- Personal Communication. 2018. Espanola Ranger District Ranger Sandy Hurlocker.
- Propst, D. L. 1999. Threatened and Endangered Fishes of New Mexico. New Mexico Department of Game and Fish. Technical Report No. 1. 84 pp.
- Rees, D.E., R.J. Carr, and W.J. Miller (Rees et al). 2005. Rio Grande Chub (*Gila pandora*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2projects/scp/assessments/riograndechub/pdf>.
- Reynolds, R. T., R. T. Graham, M. H. Reiser, R. L. Bassett, P. L. Kennedy, D. A. Boyce, G. Goodwin, R. Smith, and E. L. Fisher. 1992. Management recommendations for the Northern Goshawk in the Southwestern United States. General Technical Report RM-217, 90 pp. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO, USA.

- Reynolds, R.T., R.T. Graham, and D.A. Boyce. 2005. Habitat conservation of the northern goshawk in the southwestern United States: response to Greenwald et al., report dated December 18, 2005, Final Supplement to the Final Environmental Impact Statement (FEIS) for Amendment of Forest Plans, USDA Forest Service, Southwestern Region, Albuquerque, NM.
- Reynolds, Richard T.; Sánchez Meador, Andrew J.; Youtz, James A.; Nicolet, Tessa; Matonis, Megan S.; Jackson, Patrick L.; DeLorenzo, Donald G.; Graves, Andrew D. 2013. Restoring composition and structure in Southwestern frequent-fire forests: A science-based framework for improving ecosystem resiliency. Gen. Tech. Rep. RMRS-GTR-310. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis 1966 - 2004. Version 2005.2, USGS Patuxent Wildlife Research Center, Laurel, MD
- Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2010. Version 12.07.2011 USGS Patuxent Wildlife Research Center, Laurel, MD
- Scott, Virgil E.; Patton, David R.; 1989. Cavity-nesting birds of Arizona and New Mexico forests. General Technical Report RM-10. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 72 p.
- Smith, A. T., and M.L. Weston. 1990. *Ochotona princeps*. Am. Soc. Mamm., Mammalian Species No. 352: 1-8.
- Squires, J.R. and Reynolds R.T. 1997. Northern Goshawk (*Accipiter gentilis*). In *The Birds of North America*, No. 298 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Science; Washington, D.C.: The American Ornithologists' Union.
- Squires, J.R. and Kennedy P. L. 2006. Northern Goshawk Ecology: an assessment of current knowledge and information needs for conservation and management. *Studies in Avian Biology* 31:8-62.
- Stumpff, W.K. 1998. Rio Grande cutthroat trout management. Final Report, Federal Aid Grant F-60-M, Project 11.
- Sublette, J. E., Hatch, M. D., Sublette, M. 1990. *The Fishes of New Mexico*. University of New Mexico Press, Albuquerque, NM. 393pp.
- USDA Forest Service. 1987. Santa Fe National Forest Plan, as amended (1996, 2004). United States Forest Service, Southwest Region, Santa Fe National Forest. Santa Fe National Forest Supervisors Office, Santa Fe, New Mexico. [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5419626.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5419626.pdf)
- USDA Forest Service. 1994. The scientific basis for conserving forest carnivores; American marten, fisher, lynx, and wolverine, in the western United States. GTR, RM-254. U.S. Dept. Of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado. September. 184p.
- USDA Forest Service. 1996b. Record of decision for amendments of Forest Plans, Arizona and New Mexico. USDA Forest Service, Southwest Regional Office. Albuquerque, NM. 97pp.
- USDA Forest Service. 2002. Conservation Agreement for the Rio Grande cutthroat trout between and among New Mexico Department of Game and Fish, USDA Forest Service, and USDI Fish and Wildlife Service. Southwest Region, Albuquerque, New Mexico.
- USDA Forest Service. 2004. Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans. USDA Forest Service, Southwestern Region, Arizona and New Mexico. Southwestern Regional Office, Albuquerque, New Mexico. Pp15-28.



- USDA Forest Service. 2009. Biological Reports (BA, BE, MIS, Migratory Birds) for Hyde Park Wildland Urban Interface Project Draft Environmental Assessment. Project Record. Espanola Ranger District, Santa Fe National Forest.
- USDA Forest Service. 2012. Management Indicator Species Assessment, Santa Fe National Forest. February 2012 update. Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.
- USDA Forest Service. October 2013. R3 Regional Forester Sensitive Species List.
- USDA Forest Service. 2020. Santa Fe Mountains Landscape Resiliency Project Draft Silviculture Report. Project Record. Espanola Ranger District, Santa Fe National Forest.
- USDA Forest Service. 2021. Santa Fe Mountains Landscape Resiliency Project Draft Environmental Assessment. Project Record. Santa Fe National Forest.
- USDA Natural Resource Conservation Service. Plants Database. <http://plants.usda.gov/>
- U.S. Fish and Wildlife Service. 1995. Recovery Plan for the Mexican spotted owl. Vol.I Albuquerque, New Mexico. 172 pp.
- U.S. Fish and Wildlife Service. 2012. Mexican Spotted Owl Recovery Plan: Vol 2. Albuquerque, New Mexico.
- USDI Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. Online version available at <http://migratorybirds.fws.gov/reports/bcc2002.pdf>
- USDI Fish and Wildlife Service. 2004. Division of Migratory Bird Management. <http://migratorybirds.fws.gov/reports/speccon/tblconts.html>
- United States Geological Survey. 2004. Patuxent Bird Population Studies. <http://www.mbr-pwrc.usgs.gov/>.

## APPENDIX A – PROJECT INTEGRATED DESIGN FEATURES (IDFS)

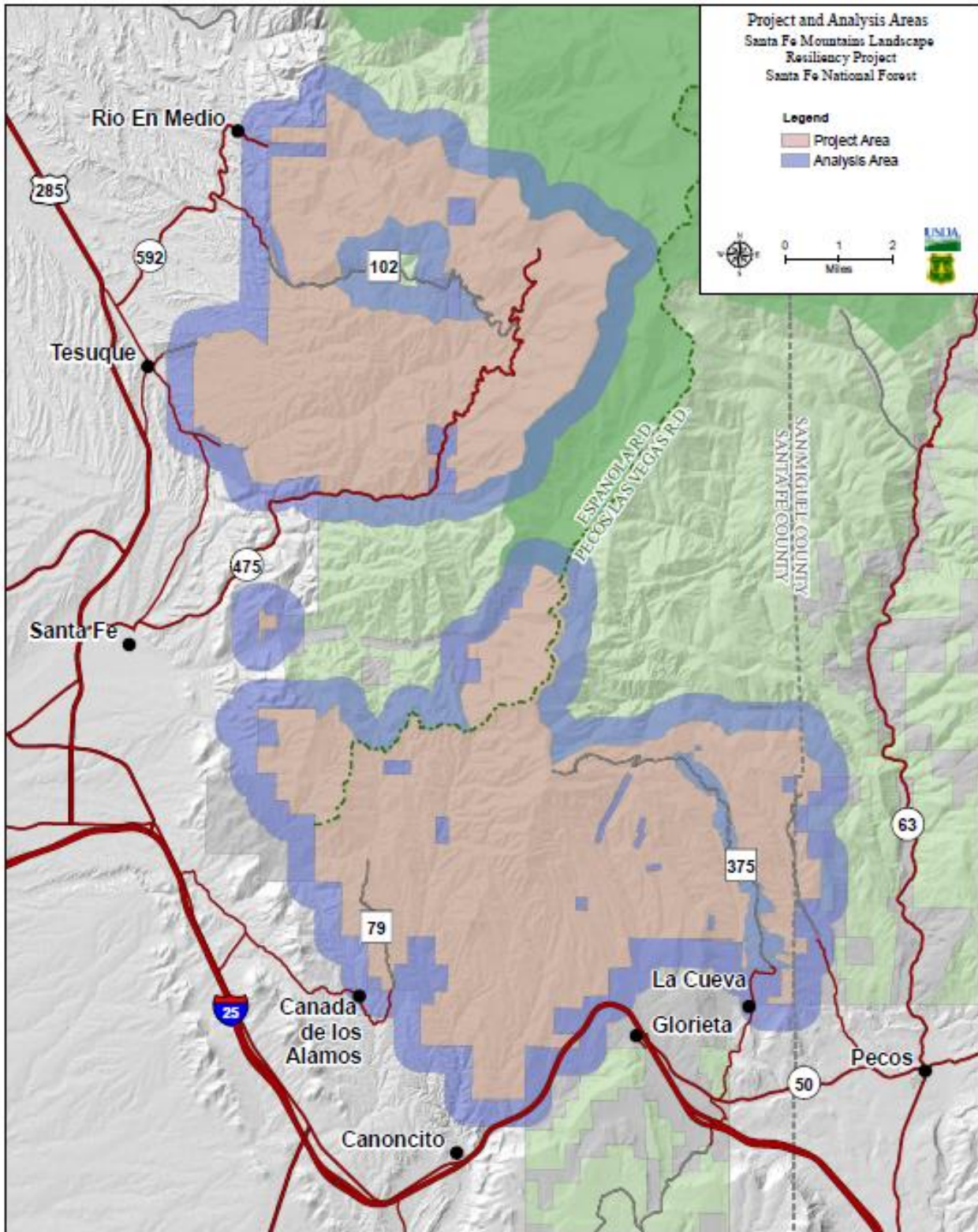
The IDFs below are implementation parameters that would be incorporated into treatments, contracts, and used to guide Forest Service personnel in conducting implementation. IDFs are developed by resource specialists to ensure the avoidance and minimization of effects from implementation actions and would be integrated as part of this project. The following are IDFs that are relevant to biology resources (e.g. T&E wildlife), but a full list of IDFs for other resources (e.g. heritage, recreation, etc.) can be found in the EA and project record and as appendices for the project Decision. These design features would be implemented as part of this project. The design features are in addition to Forest Plan and Recovery Plan requirements and often describe how the project would implement the requirements from those Plans, but also include project-specific design features meant to minimize potential impacts to all species including T&E, Sensitive, MIS and migratory birds.

This section comes directly from the EA and provides a list of integrated design features that would be implemented to avoid, minimize, or eliminate adverse impacts that might result from implementation of the Proposed Action (40 CFR 1508.20). These design features are integral to, and are considered part of, the Proposed Action. The analysis of effects presented in **Error! Reference source not found.** of the EA is based on implementation of these non-discretionary features. No mitigation actions are required to implement the Proposed Action because the analysis of effects (**Error! Reference source not found.**) does not indicate the need for any protective measures in addition to the project design features.

These would be implemented in addition to standards and guidelines from the Santa Fe National Forest LRMP Best Management Practices (BMPs), Regional Invasive Species guidance, New Mexico Air Quality Regulations, as well as Threatened and Endangered Wildlife Species Recovery Plans.

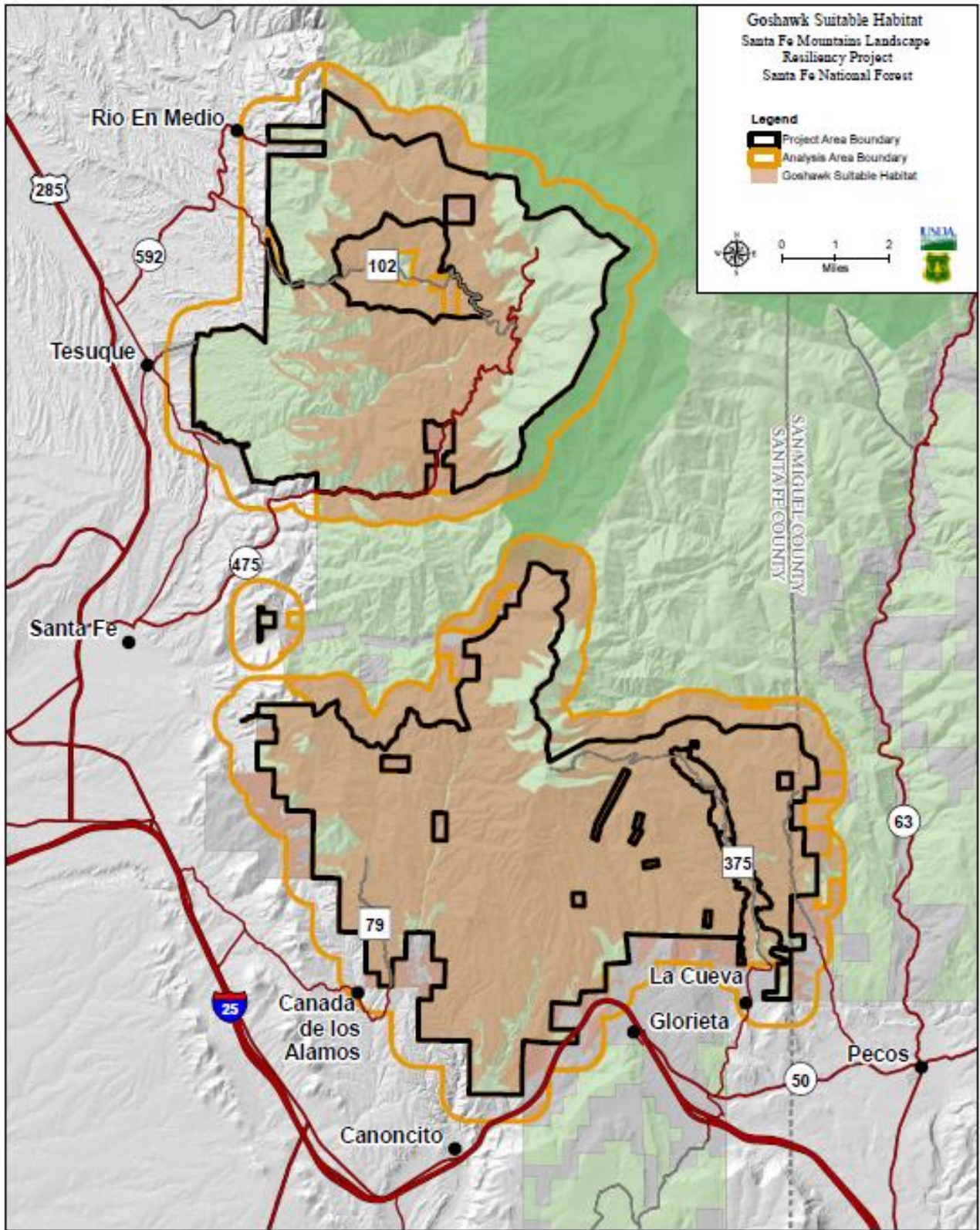
**Place holder - INSERT CURRENT IDFS**

**APPENDIX B – MAP OF THE PROJECT AREA AND ANALYSIS AREA (AA).**



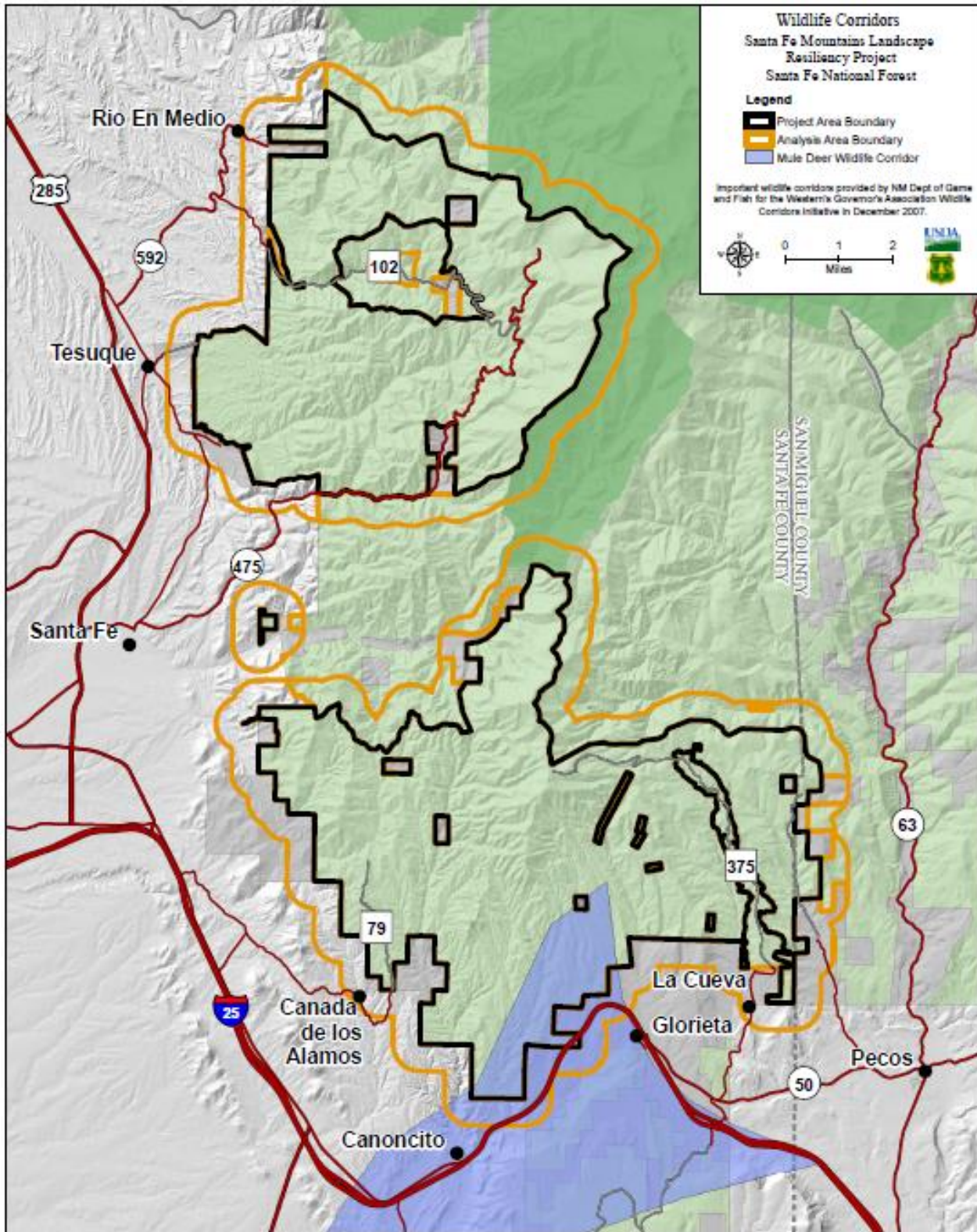
The data used to create this map is intended for broad-scale planning purposes. The Forest Service provides no warranty regarding its accuracy or use for other purposes.  
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**APPENDIX C – MAP OF GOSHAWK HABITAT IN PROXIMITY TO THE PROJECT.**



The data used to create this map is intended for broad-scale planning purposes. The Forest Service provides no warranty regarding its accuracy or use for other purposes.  
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**APPENDIX D – MAP OF MULE DEER CORRIDORS IN PROXIMITY TO THE PROJECT.**



The data used to create this map is intended for broad-scale planning purposes. The Forest Service provides no warranty regarding its accuracy or use for other purposes.  
 T:\FS\INFO\SantaFe\Project\Espanola\GIS\Map\GIS\Map\MXD\SFML\_Wildlife\_Corridor\_Page.mxd, jwl, 6/10/2022