USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Southwestern Region / Santa Fe National Forest MB-R3-10-30 July 2022

Final- Replaces the previous September 2021 Version – Not an Exact Reprint

Santa Fe National Forest Land Management Plan

Rio Arriba, San Miguel, Sandoval, Santa Fe, Mora, and Los Alamos Counties, New Mexico

Cover photo: Santa Fe National Forest visitors camping under the stars in the Pecos Ranger District.
Photo credit: Josh Szopinski

We make every effort to create documents that are accessible to individuals of all abilities; however, limitations with our word processing programs may prevent some parts of this document from being readable by computer-assisted reading devices. If you need assistance with any part of this document, please contact the Santa Fe National Forest at 505-438-5442.

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

Santa Fe National Forest
Land Management Plan

Rio Arriba, San Miguel, Sandoval, Santa Fe, Mora, and Los Alamos Counties, New Mexico

Responsible Official:

Debbie Cress, Forest Supervisor
Santa Fe National Forest
11 Forest Lane
Santa Fe, NM 87508

For Additional Information:

Jennifer Cramer, Strategic Planning and Engagement Staff Officer
Santa Fe National Forest
11 Forest Lane
Santa Fe, NM 87508
505-438-5442
santafeforestplan@usda.gov
www.fs.usda.gov/goto/santafeforestplan

This page intentionally left blank

Acronyms

AML	appropriate management level
BLM	Bureau of Land Management
BMP	best management practice
CDNST	Continental Divide National Scenic Trail
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CRMP	Comprehensive river management plan
CSU	controlled surface use
CWD	coarse woody debris
CWPP	County Wildfire Protection Plan
dbh	diameter at breast height
EPA	Environmental Protection Agency
ERU	ecological response unit
ESA	Endangered Species Act
FSH	Forest Service Handbook
HFRA	Healthy Forest Restoration Act
HUC	Hydrologic Unit Code
IPM	integrated pest management
MIST	minimum impact suppression techniques
ML	maintenance level
MMCF	million cubic feet
MOU	memorandum of understanding
MVUM	motor vehicle use map
NAAQS	national ambient air quality standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NF	National Forest
NFS	National Forest System
NHPA	National Historic Preservation Act
NM	New Mexico

NMAAQS	New Mexico ambient air quality standards
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NPS	National Park Service
NSO	no surface occupancy
OHV	off-highway vehicle
ORV	outstandingly remarkable value
PM	particulate matter
RD	ranger district
RMZ	riparian management zone
ROS	recreation opportunity spectrum
SCC	species of conservation concern
TES	Terrestrial Ecosystem Survey
TEU	terrestrial ecosystem unit
TMDL	total maximum daily load
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
WCF	Watershed Condition Framework
WSP	Wilderness Stewardship Performance
WUI	wildland-urban interface

Table of Contents

List of Tables

List of Figures

Chapter 1. Introduction

This land management plan (commonly referred to as "forest plan") guides the Santa Fe National Forest (Santa Fe NF or "the forest") in fulfilling its stewardship responsibilities to best meet the current and future needs of the American people. This plan provides the vision, strategy, and constraints that guide integrated resource management, provide for ecological sustainability, and contribute to social and economic sustainability on the Santa Fe NF and the broader landscape.

Forest Plan Organization

Chapter 1. Introduction describes the purpose of the forest plan, introduces the plan area and its context, describes the need for changing the forest plan and the themes of the new forest plan, explains the contents and concepts of the forest plan, and describes how the forest plan is implemented.

Chapter 2. Forestwide Plan Components includes forestwide desired conditions, objectives, standards, and guidelines and is presented as a unified approach with ecological resources comprising the first half of the plan components and socioeconomic resources comprising the second. Standards and guidelines are typically located in the relevant activity section of the plan, but when standards or guidelines pertain to multiple activities, they may be located in only one of the applicable resource sections.

Chapter 3. Designated Areas and Management Areas contains the plan components applicable to specific areas that call for site-specific management. This chapter is divided into two sections: "Designated Areas" and "Management Areas." Designated areas and management areas are used to describe how plan components apply to specific parcels of National Forest System (NFS) land. Designated areas are primarily designated by statute, but some categories may be established administratively through the Federal executive branch. Plan components for a designated area may differ from forestwide guidance and must provide for appropriate management of the designated area, based on the applicable authorities and the specific purposes for which the area was designated or recommended for designation.

Plan components in this chapter may differ from forestwide guidance by:

- Constraining an activity where forestwide direction does not;
- Constraining an activity to a greater degree than forestwide direction; or
- Providing for an exception to forestwide direction, when forestwide direction is in conflict with the management emphasis of the management area.

Within the boundaries of any area addressed in this chapter, direction provided here takes precedence over forestwide direction. Where specific direction is silent here, but exists in forestwide plan components, the forestwide direction applies.

Chapter 4. Geographic Areas includes desired conditions applicable to one of seven geographic areas that together encompass the entire Santa Fe NF. Geographic areas help define nuances in forestwide desired conditions that may differ slightly across the geographic areas of the Santa Fe NF or be similar in two or more geographic areas. These desired conditions can also reflect more localized priorities within these smaller-scale areas.

Chapter 5. Forest Plan Monitoring Program outlines the monitoring and evaluation of plan implementation that is used to determine progress toward achieving desired conditions and objectives, and how well management requirements, such as standards and guidelines, are being applied. The monitoring strategy provides a framework for subsequent monitoring and evaluation designed to inform adaptive management.

Several appendices provide additional information:

- **Appendix A**: Maps for the Desired Recreation Opportunity Spectrum and Scenery Management System
- **Appendix B**: Fire Return Intervals
- **Appendix C**: At-Risk Species and Associated Ecological Response Units
- **Appendix D**: Proposed Probable and Possible Future Actions
- **Appendix E**: Relevant Laws, Regulations, and Policies

Purpose of the Forest Plan

There are generally three levels of planning for NFS lands. The first and broadest level of planning occurs at the national level through the United States Department of Agriculture (USDA) Forest Service Strategic Plan, a 5-year plan that allows public transparency of the agency's goals, objectives, and accomplishments. The current strategic plan is located on the Forest Service website at https://www.fs.fed.us/strategicplan/.

The second level of planning occurs at the level of NFS administrative units through forest plans. Every national forest the Forest Service manages is required to have a forest plan that is consistent with the National Forest Management Act of 1976. The Regional Forester approved the original Santa Fe NF plan in July 1987. Since then, the forest plan has been amended 17 times to adjust for situations in specific projects or to reflect changes in scientific information, circumstances, agency and public understanding, as well as changing economic, social, and ecological conditions. The 1987 plan was written following the guidance in the 1982 forest planning regulations. This updated plan uses the 2012 Planning Rule (36 CFR 219) and the associated 2015 planning directives (FSM 1920 and FSH 1909.12).

The plan contains forest-specific guidance and information for project and activity decision making over the plan period, generally considered to be 10 to 15 years. With the direction laid out by the forest plan, management can adapt to better achieve the vision for the Santa Fe NF. The forest plan does not compel any agency action or guarantee specific outcomes. It does not list specific projects or priorities for work, although it can inform priorities based on the direction it provides. An accompanying monitoring plan provides feedback that actively tests assumptions, tracks relevant conditions over time, and measures management effectiveness.

A forest plan guides and constrains Forest Service personnel, not the public. Any constraint on the public needs to be imposed by law, regulation, or through an order issued by the responsible official under 36 CFR part 261, Subpart B. In addition to forest plans, management of NFS lands is guided and constrained by laws, regulations, policies, practices, and procedures that are in the Forest Service Directive System, which are generally not repeated in a forest plan.

The third level of planning includes development of on-the-ground projects and activities, which are designed to achieve the desired conditions and objectives of the forest plan. All projects and activities must be consistent with the forest plan.

Description of the Plan Area

The Santa Fe NF is one of five national forests in New Mexico. It was established in 1915, when President Woodrow Wilson signed Executive Order 2160, merging the Jemez and Pecos National Forests. Today, the Santa Fe NF administers almost 1.6 million acres[1] and is located in portions of seven counties—Rio Arriba, San Miguel, Sandoval, Santa Fe, Mora, Los Alamos, and only 0.2 acre in Taos County within the Pecos Wilderness (figure 1). The Santa Fe NF is divided into five ranger districts: Coyote, Cuba, and Jemez span the Jemez Mountains and are west of the city of Santa Fe (referred to as the "west side"); Pecos-Las Vegas spans the Sangre de Cristo Mountains east of the city of Santa Fe (referred to as the "east side"); and Española runs down the middle and is located on both east and west sides. The Santa Fe NF shares borders with the Carson National Forest, Bandelier National Monument, Pecos National Historic Park, the Valles Caldera National Preserve, Los Alamos National Laboratories, land administered by the Bureau of Land Management, nine pueblos, one tribal nation, and various land grants. This land management plan (forest plan) covers all the NFS lands within the Santa Fe NF boundary.

Geographical and Biophysical Context

New Mexico, the "Land of Enchantment," is a world of its own; a place where the natural world dominates both the landscape and way of life. Tucked in the Rio Grande Valley, between the snowcapped peaks of the Jemez Mountains and the Sangre de Cristo Mountains, lies the city of Santa Fe. Here, the Nation's oldest state capital shares its name with the Santa Fe NF that surrounds it.

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

Climate across the forest is varied and related to elevational range. Mean daily air temperature for north-central New Mexico ranges from minus 35 degrees Fahrenheit to 14 degrees Fahrenheit in winter and from 30 degrees Fahrenheit to 95 degrees Fahrenheit in summer. Mean annual precipitation for the area ranges from 12 to 35 inches annually, with the highest amounts at the higher elevations. The air is clean and clear, and blue skies are typical with an average of 300 days of sunshine a year. In the higher elevations, first snow usually occurs in October and then covers peaks from late November through spring. It is not uncommon to find snow on high-elevation trails into June. At lower elevations, snow is more variable, with some years receiving substantial amounts (40 inches), while other years have nothing of consequence. Spring is windy and relatively dry. June brings the beginning of monsoons, or the rainy season, which culminate in August.

[1] Total area within boundary is approximately 1,680,000 acres, which includes 1,545,349 acres administered by the Santa Fe NF plus 135,679 acres of private lands or other governmental agency lands not administered by the Santa Fe NF. Data from the Automated Lands Project.

Lightning strikes are common during the summer months, especially on the higher peaks. Fall is marked by golden aspens on mountain sides and cottonwoods along the streams.

Vegetation here is primarily influenced by fire. Vegetative diversity, demonstrated by 16 different ecological response units (ERU), can in part be attributed to the expansive 8,000-foot elevational range in the Santa Fe NF. At one extreme, the alpine tundra ERU is characterized by a cold and harsh existence that persists from early fall well into late spring; and water keeps the granite foundation locked in gray ice. At the other extreme, hotter and drier lower elevations support a spectrum of prairies, woodlands, grasslands, and shrublands; and slow-growing and twisted piñon pine and juniper dominate the landscape. Together with a mosaic of grasses and springtime wildflowers, these parts of the forest provide an abundance of habitat for a diversity of wildlife.

The bulk of the Santa Fe NF lies between these climatic and elevational extremes. Ponderosa pine dominates the landscape and waits for frequent fire to clean up the scattered litter of needles, fallen trees, and carpets of seedlings. As elevation climbs and more water is available, other types of conifers (such as Douglas-fir, spruce, and fir) and sometimes aspen begin to mix with or replace ponderosa pine. Mixed conifer-frequent fire and ponderosa pine forest ERUs together account for almost 50 percent of the vegetation types in the forest. Piñon juniper woodland and spruce-fir ERUs make up an additional 28 percent of the vegetation. The forest represents an important proportion of all four of these vegetation types regionally and has a high potential to contribute to the sustainability of these ecosystems.

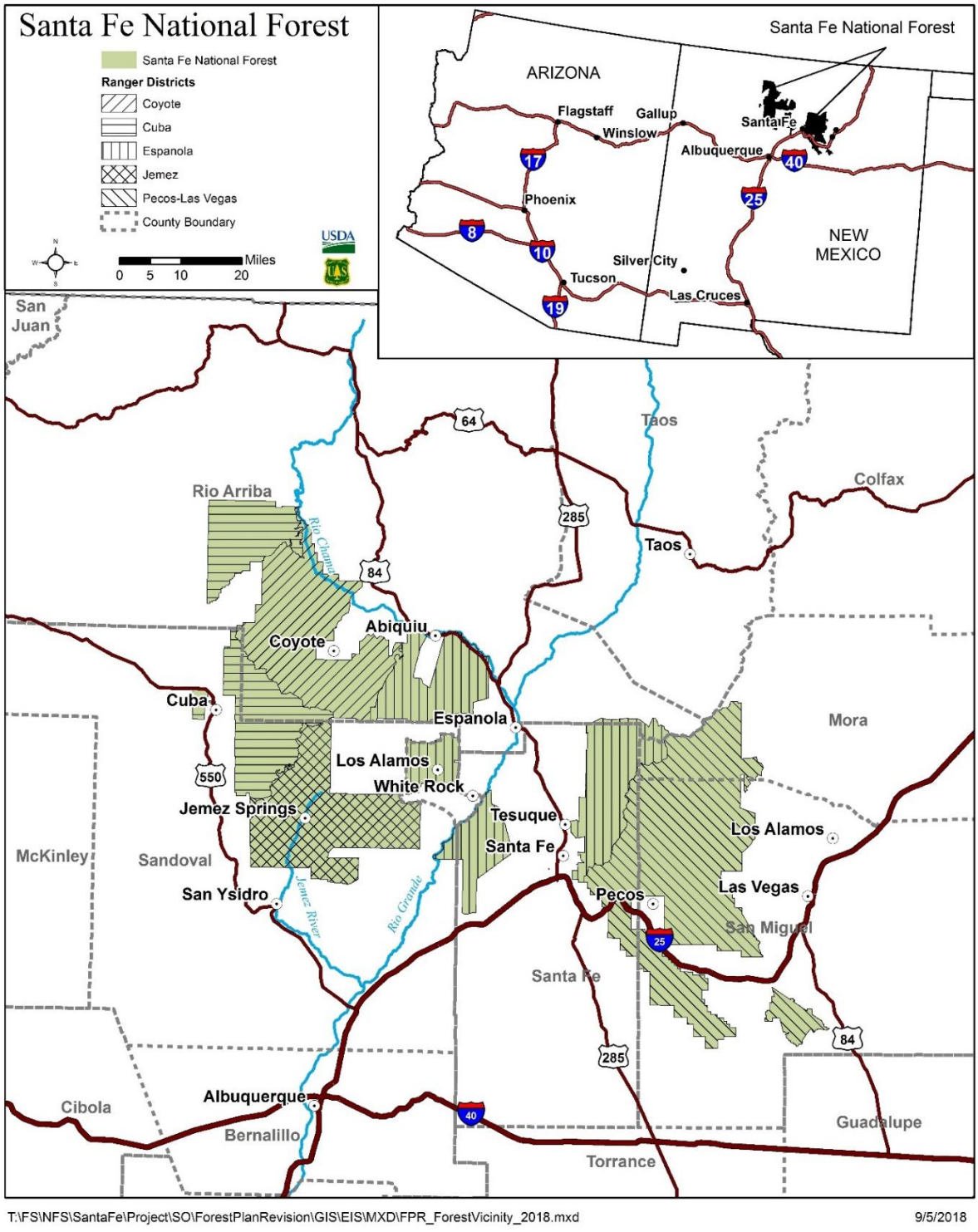


Figure 1. Vicinity of the Santa Fe NF showing county boundaries, major highways, and major rivers. The inset shows the location of the Santa Fe NF within New Mexico.

Historical Context

The plan area contains historic properties that demonstrate human occupation and use for approximately the past 12,000 years. Native Americans (American Indians) with Pueblo and Athabaskan ethnic affiliation and groups ancestral to these ethnic affiliations have occupied and used the plan area during this entire time. Euro Americans and other peoples from the Old World have occupied and used the plan area for approximately the past 400 years. The USDA Forest Service has managed the plan area for slightly more than 100 years. Native American, Hispanic, and Anglo-American traditional communities continue to use the plan area for economic, social, and religious purposes.

The cultural and historical landscape of the Santa Fe NF contains the remains of human activities extending as far back as 11,000 years. The Santa Fe NF contains three cultural geographic subdivisions—the Española basin, the Jemez Mountains, and the Sangre de Cristo Mountains. Before the Spanish arrived, there was a diverse occupancy including Paleoindians, Archaic hunter-gatherers, Pueblo Indians and other Native American groups including the Ute, the Apache, the Comanche, and more sedentary bands of Apache that were to become the Navajo, expanded onto lands that are now the Santa Fe NF.

Between 9000 and 5000 B.C., Paleoindian big game hunters used lands currently occupied by the Santa Fe NF, as indicated by the transition between the Paleoindian and Archaic eras that took place around 8,500 to 8,000 years ago. During the Archaic era, Native Americans continued the hunting and gathering lifestyle seen during the Paleoindian period. This era saw increases in population, social and technological changes, and agricultural advances. A shift from a mobile lifestyle that focused on hunting and gathering to a primary reliance on subsistence farming, marked the beginning of the Pueblo era in the southwestern region. The Pueblo era corresponds to the last millennium of Native American occupation prior to A.D. 1600. The persistence of the Late Archaic appears to have lasted well into the 7th century and as late as the 10th century. Intensive occupation by Ancestral pueblo populations appears to have increased around the end of the 12th century. There is greater cultural differentiation between groups indicated by increasing differences in settlement types and patterns, styles of artifacts (such as pottery), and land use practices. Before A.D. 1300, cultural divisions can be distinguished based on Native American oral history and correlated by descent with contemporary Native American ethnic divisions.

The nature of the cultural landscape of northern New Mexico changed in 1542, with the entry of the expedition led by Spanish explorer Francisco Vásquez de Coronado. Between 1598 and 1821, the Spanish consolidated their colony in New Mexico by establishing mission communities and awarding land grants, or *mercedes*. Communal land grants formed the basis of many of the larger traditional Hispanic villages, providing grazing lands and forest resources in the form of timber and water and irrigation to these communities. In 1680, the Pueblo Revolt temporarily drove the Spanish out of New Mexico; in 1692, Diego de Vargas led the reconquest of the region, which lasted several years. In the period after the reconquest, the Pueblos gained a measure of protection under the Spanish Crown. This protection was threatened in 1821, when Mexico claimed independence from Spain. At this time, pueblos experienced an influx of Hispanic communities onto tribal land. On February 2, 1848, the Treaty of Guadalupe Hidalgo ended the Mexican-American War. A significant outcome of the treaty was the ceding of vast amounts of Mexico's northern frontier boundaries to the United States. These lands became territories of the United States government and their citizens were given a choice to relocate southward to areas within the readjusted boundaries of Mexico or remain and become U.S. citizens with all associated constitutional rights.

Land not held under titles perfected under Spanish and Mexican law passed into the public domain of the United States. Determining validity of land grant title claims was the responsibility of the Surveyor General's office established in 1854. The process of patenting land grant applications was ponderous and inefficient, and only 46 out of 135 claims state-wide were confirmed. The former Mexican citizens in these areas had little to no English language fluency and the inherent differences between the two nations' legal systems relevant to land ownership were foreign to the newly naturalized American citizens living within the newly constituted boundaries of lands they had called home since settlement by Juan de Oñate in 1598. The current boundaries of the grants are a result of the land adjudication that took place after 1848. Lands beyond these boundaries, including some that extend onto the Santa Fe NF, are still claimed by several grants. Acquisition of these lands by the United States resulted in a prolonged disconnection by disaffected land grant heirs to these communal land grants that provided subsistence and cultural belonging since 1598.

Population growth, settlement expansion, and economic diversification occurred across New Mexico and markedly affected settlement. The railroad reached Albuquerque in 1880, and the Santa Fe Railroad connected with the Southern Pacific Railroad at Needles in 1883. The development of a transcontinental railroad system drove the further development of the logging and mining industries in the plan area. Between 1912 and the beginning of World War II, demand for resource extraction and commercial logging increased. In 1933, President Franklin Roosevelt introduced the New Deal program to help combat the adverse effects of the Great Depression. As a result of this program, the Santa Fe NF benefited from the Civilian Conservation Corps where at least three camps housed men who constructed fish structures in the Sangre de Cristo Mountains erosion control features, roads, recreational sites, fire towers, telephone lines, and roads to facilitate communication for the fire program. Some of these historic Civilian Conservation Corps structures are still in use today.

Development of a transcontinental highway system began during the 1920s and 1930s. The Atchison, Topeka & Santa Fe Railroad in 1879, and the establishment of Route 66 through Santa Fe in 1926, brought new settlers and increased tourism to the area. This led to direction from the Forest Service promoting outdoor recreation for incoming visitors from across the country. One approach included issuing permits for recreation residences in certain parts of forests where the public could build a cabin on NFS land and use it for recreation purposes. Population growth, settlement expansion, and economic diversification at the end of the 19th century and the beginning of the 20th century resulted in expanded use of the lands.

Legislative efforts to convey Santa Fe NF land to ownership by federally recognized tribes resulted in congressional acts that legally conveyed former Santa Fe NF land to tribal governments. This includes former portions of the Española Ranger District conveyed to the Pueblo of Cochiti in 1984, and other areas in 2000 to the Pueblo of Santo Domingo. Similar congressional action in 2006 resulted in other tracts of land within the Española Ranger District adjacent to Los Alamos County being conveyed to the Pueblos of Santa Clara and San Ildefonso. Starting in the late 1960s, and coinciding with the national Civil Rights movements of that era, land grant supporters began staging protests demanding restoration of former land grant land now under management by the Santa Fe NF to current land grant heirs who live in communities adjacent to the national forest. Restoration of these lands has been the subject of congressional legislation in 1998, and as recently as 2018, in the U.S. House of Representatives. The visibility of land grant issues in the state legislature was significant enough for the state to form the New Mexico Land Grant Council in 2009. Today, supporting traditional communities' use of national forest lands as part of their living culture is an important component of managing the Santa Fe NF.

Distinctive Roles and Contributions of the Santa Fe National Forest

The Santa Fe NF is unique in its diverse geographies and natural settings, and its historical and cultural richness. These unique qualities result in numerous distinct contributions to the local area, region, and Nation in the form of habitat for rare and endangered species, essential ecosystem services and multiple uses, protection and support of cultural values and traditions, and outstanding recreation opportunities, to name a few.

Due to the expansive elevation range, the Santa Fe NF displays an unusual vegetative diversity; several vegetation types found at the highest elevations are rare both in the forest and regionally, and are often unique to national forest land in the state and the Southwest. Three research natural areas are designated or proposed in the forest to protect some of these unique systems, such as ungrazed, high-elevation Thurber fescue meadows, and ensure they can contribute to scientific discovery and education now and in the future. People are temporary visitors to these peaks, and, for those not driven by scientific curiosity, the vast vistas laid out before them serve as more than ample rewards for attaining the summits.

Lower elevations support an abundance of savannah-type habitats with forage for diverse wildlife and livestock. Although the forest is not unique in its provision of livestock grazing lands, the grazing tradition the Santa Fe NF supports is closely linked to the land grants of New Mexico, which are just one of the many distinct cultures that have been drawn to the accessibility and bounty of these lands throughout history.

The rich history and cultural uniqueness of northern New Mexico are crucial components to framing the distinctive character, roles, and contributions of the Santa Fe NF. Multiple cultures have made the land in and around the Santa Fe NF their home, and thrived here in part because of resources the forest provides. Humans' steadfast dependence on the national forest has remained for thousands of years. No other place in the United States has a continuity of occupation equal to that surrounding the Santa Fe NF. In addition, the prevalence and age of the land grants in New Mexico fostered an ideology of the land's relationship to the community, and that land was used primarily to provide sustenance, as opposed to serving as a commodity to be exchanged or sold. Many of the ways the forest is used today originated from past cultures and lifestyles and are as crucial for subsistence among contemporary residents of small rural communities as they were generations ago. Today, over 30 tribes look to the Santa Fe NF as part of their ancestral lands and the forest continues to provide access and resources for dozens of communities of land grant heirs.

Local people have an attachment to the landscape of the Santa Fe NF. They look at the forest in their backyards as an integral part of their community and history. The forest fosters social sustainability as it provides the backdrop to family stories about great grandpa's hunts with only his horse, fishing gear, rifle, tarp, and a frying pan, or to memories of when grandma and her family were scared by a bear while picking berries along the creek; these stories make up the lasting fabric of the communities in and around the forest. The history and popularity of the forest in the past as well as modern times have left their mark, allowing for extensive access to resources and recreational opportunities for all peoples.

Parts of the Santa Fe NF that lie between the arid grasslands and alpine peaks are the most popular for recreation with their diverse and beautiful landscapes. The forest is known as one of the best aspen-viewing spots in the Southwest, with glorious white-barked aspens providing spectacular displays of brilliant yellow leaves each fall. With well-kept, road-accessible aspen trails within an hour's drive of Santa Fe, this spectacular yearly event is accessible to all. Dense spruce-fir forests

dominate designated wilderness areas like the Pecos Wilderness, which provides numerous places for hikers who prefer more difficult or solitary trails to escape into nature while being serenaded by the bugles of bull elk.

Elk, along with other hunted species such as bighorn, deer, and turkey, provide cultural connections to the Santa Fe NF as well as outstanding recreational opportunities and employment opportunities for outfitters and guides. The forest's geographic location provides important stopovers for both migratory birds and pollinators traveling along the Rocky Mountains into Canada and Mexico. The forest also contains important breeding and nesting areas for many species of songbirds, hummingbirds, raptors, and waterfowl. This diversity contributes to New Mexico having the second highest number of bird species (over 500) of all states, nearly 80 percent of which can be found in the Santa Fe NF. Diverse plant communities support pollinators that service surrounding agricultural crops and orchards, and produce honey. Numerous endemic species are found in the forest including the Rio Chama blazing star, found only in the Chama River Canyon, and the Holy Ghost ipomopsis, found only in the Holy Ghost Canyon. The forest provides critical habitat for four threatened and endangered species, including habitat that supports a large portion of the Mexican spotted owl populations within the region.

In the dry, high desert mountains "el agua es vida," water is life. Springs and aquifers are found throughout the forest and provide continuous supplies of water. Riparian corridors and aspen groves attract visitors and provide disproportionately important wildlife habitat because of the water they provide. Water captured as snow by the forest's mountains travels through hundreds of streams across the landscape, delivering water beyond the national forest boundaries. Historic acequias channel water from the forest to surrounding small farms and communities, as they have done for hundreds of years. The Rio Grande and Pecos Rivers, New Mexico's two longest and most important rivers, flow through the Santa Fe NF; the headwaters of the latter originating from high in the Pecos Wilderness. In addition, municipal waters for surrounding communities, including the Santa Fe watershed for the city of Santa Fe and the Gallinas watershed for the city of Las Vegas, are in the Santa Fe NF.

In addition to unique flora and fauna and essential ecosystem services like water provisioning, the Santa Fe NF boasts expansive blue skies, indicative of some of the best air quality in the world. Local residents breathe easily and experience the mental health benefits of being able to view extensive natural scenery largely unimpeded. When smoke from controlled burns impacts the air quality, the Santa Fe NF's public affairs personnel actively alert the public to any temporary dangers.

Below the surface, marine fossils from 290 million years ago lay embedded within the Madera Formation on the west side of the Santa Fe NF. An *Equus niobrarensis* (horse) from the end of the last Ice Age and an *Aepycamelus sp*. (camel) have been excavated from the forest and are now in museums where they help tell the story of Earth's past. Oil and natural gas from the Cuba Ranger District annually[2] provides 1.5 million gallons of gasoline, electricity for 11,800 homes, employment opportunities, and significant revenue for the State of New Mexico.

Timber is not a major industry in the Santa Fe NF, partly because there are fewer large trees of commercial value. Instead, the value many local communities draw from the forest's wood resources is the abundant fuelwood. Fuelwood is used as the primary and sometimes only fuel

[2] 2017 production data

source for cooking and heating in rural homes. The earliest residents used wood products from the Santa Fe NF for building simple housing structures. This historic architecture inspires the spruce-fir poles for coyote fences and pine *vigas* and *latillas* (ceiling beams) that make modern northern New Mexican homes so distinctive. Traditional communities and families that live around the Santa Fe NF continue to look to the resources found here for economic opportunity and vitality, and to sustain the cultural practices that form the backbone of northern New Mexico life. For centuries, the forest has provided forage for livestock grazing; a place to fish and hunt wild elk, deer, turkey, and other game; and water to irrigate crops via *acequias* (community irrigation ditches). The Santa Fe NF also provides a place for traditional ceremonies, religious worship, and is where many important sacred sites to federally recognized tribes and pueblos are located.

Recreational opportunities abound on the Santa Fe NF, as people seek fresh air and a connection with nature. People who come to the forest include residents of rural surrounding towns; the urban populations of nearby Albuquerque and Santa Fe; and visitors from New Mexico, Colorado, Texas, and beyond. From developed to dispersed, and from winter snow activities to summer days along the riverbanks, visitors enjoy a diversity of recreational opportunities. Hiking, mountain biking, camping, fishing, hunting, backpacking, rock climbing, bird-watching, horseback riding, swimming, piñon gathering, driving, sightseeing, and photography are just some of the ways people spend their time at the Santa Fe NF every day. Downhill skiing and snowboarding at Ski Santa Fe in the Sangre de Cristo Mountains and river rafting and boating down the Rio Chama are two popular activities that draw people to the Santa Fe NF; these sites are managed specifically for recreational needs under special-use authorizations. The expansive Pecos Wilderness is a prime destination for backpackers. Wildlife sightings evoke a sense of wonder for many forest visitors and are often one of the most identifiable ways that people connect with nature. Researchers and schools visit the forest for education, connecting kids to nature and prompting the next generation to learn about and value natural resources and traditional activities. Visitors to the forest support local economies by eating at restaurants, buying food and gas, staying in hotels, renting equipment, and enlisting the services of outfitters and guides.

Designated areas celebrate special places across the Santa Fe NF. About 18 percent of the forest is managed as one of four congressionally designated wilderness areas—the Pecos Wilderness, San Pedro Parks Wilderness, Chama River Canyon Wilderness, and the Dome Wilderness. The Pecos Wilderness is the second largest wilderness in New Mexico, offering excellent opportunities for solitude and primitive recreation in canyons, mesas, waterfalls, high-elevation forests and tundra, and 15 lakes. The San Pedro Parks Wilderness represents high altitude “parks,” or wetland meadows, that are the headwaters to many streams and home to a unique flora. There are three designated wild and scenic rivers, the most of any forest in the southwestern region. These rivers not only provide recreational opportunities, but over half of the river miles are characterized by high water quality and have few developments along their banks. Many of these designated areas also provide for exceptional recreational opportunities in the Santa Fe NF. The Jemez National Recreation Area is the only national recreation area in the southwestern region. Four of New Mexico’s eight national scenic byways traverse the Santa Fe NF, as well as the Continental Divide Trail, one of the Nation’s 11 national scenic trails. Two national recreation trails and three of the Nation’s 19 national historic trails also pass through the forest.

Need for Changing the 1987 Forest Plan

The conditions, trends, and sustainability of ecological, social, and economic resources on the Santa Fe NF were published in 2015, as part of the assessment required by the 2012 Planning Rule (36 CFR 219). The assessment is the first phase of the forest plan revision process and provides a baseline of current conditions and trends for 15 resource topics on the Santa Fe NF (as per 36 CFR 219.6(b)). The assessment helped identify portions of the 1987 Forest Plan that were working well and meeting desired management objectives, and those that were not. Extensive public and interdisciplinary team involvement, along with science-based evaluations, helped to further identify and refine the concepts of what was not working in the 1987 Forest Plan. These areas that were not working well informed "Need for Change" statements and provided focus for developing this plan, particularly in creating plan components to help ensure management meets desired conditions for each resource.

Overall. There is a need for plan direction that:

- Is strategic and identifies desired conditions with objectives for how resources should be managed;
- Eliminates redundancies with existing laws, regulations, and policy;
- Removes requirements to prepare additional resource plans; and
- Incorporates the best scientific information

Staff of the Santa Fe NF identified 12 focus areas that have the greatest needs for new or different plan direction. These are presented first below. Needs for change for additional resources follow and represent additional cases where changes are needed in plan direction.

Frequent fires (low-severity) systems. Fire exclusion and past management activities have limited frequent, low-severity wildfires on the landscape. Wildfire atypical of historic fire regimes has resulted from higher densities of trees, increased fuel loadings, and altered species composition from mature, fire-tolerant species toward shade-tolerant, less fire-resistant species. There is a need for plan direction that:

- Recognizes the natural processes of fire and its use as a management tool for vegetation types in the Santa Fe NF and that supports integrated resource objectives.
- Allows fire managers the flexibility to manage naturally ignited fires to meet resource objectives based on weather and site-specific conditions (such as fuel conditions, topography, safety concerns, and values). These actions may include the use of fire to reduce excess fuels, moderating the risk of future high-intensity fires, improving wildlife and range habitat, encouraging aspen regeneration, and improving watershed and overall forest health.
- Includes the flexibility to manage for all resources when managing wildland fire (prescribed and natural) to accomplish integrated resource objectives.

Grass Cover. Grassland (montane subalpine grasslands and Colorado Plateau/Great Basin grasslands), woodland (juniper grass, piñon-juniper grasslands, piñon-juniper sagebrush), and shrubland (sagebrush shrublands) ERUs have significantly less grass cover and productivity as a result of the exclusion of wildfire as well as legacy (historical) livestock grazing, wildlife grazing, and roads. This lack of cover contributes to reduced water infiltration, accelerated erosion, and declining soil productivity, especially during periods of drought, and contributes to a cycle that

continues to reduce vegetative cover. In addition, native grasses on much of the landscape have been replaced with nonnative and invasive species, and are not as effective in preventing erosion or as productive for forage. There is a need for:

- Desired conditions, standards, and guidelines that allow for the restoration, conservation, and maintenance of grass productivity and diversity, emphasizing native grasses.
- Plan guidance that limits and reverses woody species encroachment into grasslands and infill of scrublands, woodlands, and forested systems.

Riparian Ecosystems. Higher soil moistures, cooler temperatures, and greater productivity typically characterize riparian areas. Riparian systems have been degraded and are at risk across the Santa Fe NF. However, human alterations to the landscape, such as diversion of waterways, introduction of invasive plants, unauthorized grazing, and heavy recreational impacts are altering these systems. There is a need for:

- Desired conditions to restore or maintain characteristics composition and cover of riparian vegetation.
- Standards and guidelines that minimize the ecological impact of multiple uses in riparian areas.
- Management approaches that recognize the reliance of riparian systems on upland ecological health.

Restoration of Ecosystem Resiliency. Resiliency is the ability of an ecosystem to regain structure, composition, and function following disturbance on a time span that is consistent with the dynamics of the ecosystem. At least half of the vegetation types in the Santa Fe NF are highly departed from the natural range of conditions (fire frequency, seral state proportion, patch size, and coarse woody debris) that are most indicative of resiliency in these ecosystems. There is a need for:

- Plan direction that recognizes the interdependence of resources, provides for management areas that reflect natural features or ecological boundaries, incorporates adaptive management components to better respond to changing environmental conditions, and supports an all-lands approach of working with neighboring land managers to implement projects that improve landscape connectivity across mixed ownerships where natural systems span multiple administrative boundaries.
- Desired conditions that promote natural disturbance processes that sustain forest carbon sequestration and emphasize silvicultural practices of uneven-aged management, and standards and guidelines that limit nonnative species, while encouraging native species.

Water. Both natural and human-caused disturbances are affecting the condition of the water resource across the forest. Although wildfires are a natural disturbance, the increase in intensity and severity in recent years is having a significant impact on watershed health. There is a need for plan direction:

- To protect stream channels, hydrological function, and condition of water-dependent systems by maintaining and restoring upland and riparian vegetation cover and reducing erosion and sedimentation from disturbed sites (e.g., reclaiming roads) where feasible.

- That provides for sustainable groundwater-dependent ecosystems (e.g., seeps and springs, fens, and wetlands) and for the long-term protection of groundwater quality and quantity in the Santa Fe NF.
- That considers consumptive water uses and water rights because water is over-allocated and will continue to be in high demand.

Soils. Soil condition and soil erosion hazard are directly linked to site productivity and soil resilience. Current soil loss rates exceed natural soil loss rates across the Santa Fe NF. The majority of the forest has a high probability for accelerated erosion due to natural disturbances or management disturbances that expose the soil surface without incorporating erosion control measures. There is a need for:

- Plan direction that promotes the maintenance and restoration of soil condition and function (e.g., hydrology, stability, and nutrient cycling) by limiting the amount of exposed soil and by restoring and maintaining sufficient vegetative cover.

Relationships and partners. Relationships and effective partnerships are key to the successful implementation of the forest plan that will protect the land and serve the people. There is a need for management approaches:

- To streamline both the processes that leverage partners and volunteers and build stronger relationships with the public, including but not limited to State and Federal agencies, cities and counties, tribal governments, recreational and forest user groups, environmental groups, land grant communities, youth, and vendors.
- That will emphasize public education regarding the Santa Fe NF's diverse ecological, social, and economic resources; the multiple-use philosophy; public laws and regulations; and management strategies.

Range. Vegetation analyses show that the grassland types commonly used for livestock grazing are trending toward unsustainable productivity. Declines in herbaceous ground cover as a result of woody encroachment, and soil compaction and erosion may affect the long-term ability of national forests to sustain the productivity of rangelands. Another risk includes introduced invasive species that out-compete nutritious native forage. Drought is another factor that impacts this resource. There is a need for:

- Plan direction that provides opportunities to use adaptive management for the range program that incorporates ecosystem-based desired conditions, with particular emphasis on strategies to address drought and other extreme weather-related events.

Recreation. The ability of the Santa Fe NF to provide a meaningful recreation program is at risk, reflecting increasing and changing demands in a resource-constrained management environment. There is a need for plan direction:

- On sustainable recreation management to provide high-quality recreational experiences that are consistent with the Santa Fe NF's social, environmental, and economical resource capacity, while balancing changing trends in services and intended use of recreation infrastructure and facilities.
- To help manage recreation activity impacts to areas sensitive to resource degradation or at risk due to high visitation, and to reduce user conflicts.

Infrastructure. The Santa Fe NF's ability to maintain its current infrastructure is severely threatened. Although there are about 6,900 miles of roads on the landscape, only about 2,200 miles of roads are open to the public for motorized use as per the motor vehicle use map (MVUM). The remaining 4,700 miles of roads may be administrative use roads or non-system roads. Unmaintained or poorly maintained roads contribute to soil erosion and sedimentation, reflecting a critical and growing gap in resources for maintenance. Infrastructure related to rural and agronomic uses, such as timber harvesting, grazing, and rangeland management is in need of maintenance to better serve their purposes and prevent resource damage. There is a need for:

- Plan direction to ensure sustainable infrastructure (e.g., roads, recreation and administrative facilities, range improvements, and maintenance), and standards and guidelines that address negative impacts of existing roads.

Land Status and Ownership. The lands program in the Santa Fe NF is stretched beyond its ability to keep up with increasing demands on its services; including access issues (in general and to private inholdings), encroachments from private land onto NFS land, title claims, evolving requests for communication sites, the ever-growing wildland-urban interface (WUI) area, completing property boundary surveys, and fragmentation. There is a need for:

- Plan direction regarding access to private lands, including during evaluation of infrastructure placement, to minimize natural resource damage, while ensuring rights of access to private lands are respected.
- Plan direction regarding sites for the growing demand related to communications infrastructure.
- Plan direction to protect existing public access rights and provide for new recreational access opportunities to national forest lands.
- Management approaches that support coordination between local governments and the Forest Service regarding permits, leases, and easements on national forest lands.

Monitoring. Monitoring is a critical element of adaptive management and is used to determine if management is meeting desired conditions laid out by the forest plan. There is a need for:

- Monitoring at appropriate scales, including monitoring beyond the Santa Fe NF boundary, to compare forest resources with their status on a larger context scale or even between neighboring forests.

Additional resource needs for change include:

Wildlife, Fish, and Plants. The Santa Fe NF is home to hundreds of animal, plant, and fungi species. Species rely on habitat within the forest because they may be rare and restricted only to this and other national forests, or because changing land use patterns outside the forest increases their reliance on habitat within the Santa Fe NF. There is a need for plan direction:

- That supports restoration and maintenance of ecological conditions that contribute to the recovery and conservation of federally listed species (threatened and endangered), maintaining viable populations of the species of conservation concern, and maintaining common and abundant species.
- For terrestrial and aquatic habitat connectivity for species migration and movement.

Air. Although air quality is generally in good condition, visibility and ambient air quality associated with particulate matter can increase with larger, more severe wildfires and increases in fugitive dust. Excessive nitrogen deposition can adversely affect sensitive and aquatic ecosystems as well as cultural resources. There is a need for:

- Plan direction for air quality in terms of ambient air quality, visibility, and critical loads.

Socioeconomic Resources. Demands for socioeconomic uses of the forest such as recreation, livestock grazing, hunting, and gathering fuelwood are expected to continue or even increase. Many of these uses have traditional roots and are important for sustaining local rural communities. They also contribute to employment and labor income of the surrounding area. There is a need for:

- Plan direction that recognizes the Santa Fe NF's role in contributing to traditional and cultural forest uses and local economies, including service-based sectors such as recreation and tourism, timber, and other multiple-use related activities and products.

Traditional and Cultural Ways of Life. There are deep and historic ties between nearby populations and the Santa Fe NF. As a defining element of northern New Mexico's cultural context, the lands of the forest have continuously provided economic, social, and religious value to traditional communities. The continued use and access to the forest for traditional uses contributes greatly to the preservation of local culture. There is a need for:

- The forest plan to recognize and protect historic and contemporary cultural uses—both economic and non-economic—for tribes as well as traditional communities not considered under tribal relations (e.g., traditional Hispanic and Anglo communities).

Areas of Tribal Importance. NFS lands in Santa Fe NF are part of many federally recognized tribes' aboriginal or traditional use areas as well as places for contemporary uses including cultural and religious activities. Tribal use can be impacted by both ecological conditions and socioeconomic uses of the forest. There is a need for:

- Management approaches that include opportunities for integrating forest management with tribal needs through shared stewardship to address threats to adjacent tribal resources to meet common objectives identified in tribal and pueblo land management plans and to use an "all lands" approach to resource management.

Cultural Resources. The Santa Fe NF includes the locations of thousands of historic properties and traditional cultural properties. There is a concern that sacred and ancestral sites are protected. Historic properties are a major source of information regarding the history of human occupation of the plan area and are a way local communities remain connected to the land and their cultural identity. Properties and sites are vulnerable to degradation by natural (e.g., erosion and high-severity wildfire) and human processes that can affect their intrinsic cultural value. There is a need for plan direction:

- To stabilize, preserve, interpret, and protect historic and sensitive properties, (e.g., archaeological sites, historic structures, and traditional cultural properties).
- That recognizes the inherent value and preservation of Native American traditional cultural properties and sacred sites, as well as non-Native American traditional cultural properties, while maintaining the anonymity of such sites where appropriate.

Extractive Multiple Uses. The majority of wood products from the forest is in the form of fuelwood and smaller forest products (e.g., vigas, latillas, and coyote fencing) that are significant for both their traditional and cultural importance as well as economic contributions. Mechanized harvesting of forest products is also an important component to maintaining appropriate vegetative characteristics and promoting desirable ecological processes and function. There are varying degrees of potential for the production of a variety of renewable and nonrenewable energy sources on the Santa Fe NF. There is a need for plan direction:

- That provides for the use of a variety of forest products by commercial, noncommercial, tribal, and land grant users.
- That allows for flexible size criteria regarding timber extraction to balance desired conditions and the ability to provide economically viable forest products.
- Regarding traditional and alternative energy sources that balances demand with natural resource impacts.

Scenery. People are drawn to the Santa Fe NF for its diversity of scenic features. Scenery contributes to a sense of place and identity, with a wide variety of spectacular ecological and cultural features. Enjoying the natural scenic beauty and natural features of the forest environment is among one of the top two recreation activities on the Santa Fe NF. There is a need for:

- Plan direction to integrate scenery management into all resource management decisions with the intent of retaining and enhancing scenic resources, while integrating with other resources (e.g., restoration, habitat diversity, and timber management).

Designated Areas. The qualities that led to the designation of these areas contribute to social sustainability by connecting people to their natural and cultural heritage and providing recreation opportunities. These areas also contribute to ecological sustainability by preserving intact natural systems and their individual components. There is a need for plan direction:

- To identify and evaluate potential additions to the National Wilderness Preservation System and eligibility for including in the National Wild and Scenic Rivers System.
- For designated and recommended wilderness areas to protect and enhance wilderness values and character.

Santa Fe National Forest Vision

The forest vision reflects the overarching emphases that emerge from the work this plan guides, both internally and with partners, and provides the context for the plan. Our vision is woven throughout the plan, guiding our management across all resources.

We will be a leader, both in the forest and partnering on lands across northern New Mexico, in achieving three goals: (1) **restore fire resiliency to our forest landscapes,** (2) **provide clean and abundant water,** and (3) **honor and strengthen ties to the land**. We recognize that communities and tribes already have connections to the land. We also recognize that the challenges and opportunities we face are much bigger than us—we will only be successful by working together across program areas and boundaries. We are a learning organization that faces complex challenges holistically and adapts to changing conditions.

Restore Fire Resiliency to our Forest Landscapes

- **Expand our work to reduce the risk of uncharacteristic fire** and post-fire flooding across priority landscapes. Improve wildlife habitat and reduce risk to cultural resources.
- Use **all available tools and resources**—prescribed fire, managing natural fires for resource benefit, and mechanical treatments—and ensure program integration to achieve forest desired conditions.
- Provide a **sustainable supply of fuelwood and wood products** to communities and the local forest industry as a by-product of restoration activities.
- **Excel as a wildland fire organization**, responding appropriately to fire with firefighter and public safety as our top priority.

Provide Clean and Abundant Water

- Work with a diverse range of partners to restore priority wetlands and riparian areas.
- **Focus collaboration and efforts within important watersheds** for the benefit of sensitive species, acequias, and municipal water systems.
- Collaborate with producers and other partners to **advance mutually beneficial projects** to provide water for livestock while conserving sensitive riparian areas.

Honor and Strengthen Ties to the Land

- Work closely with **traditional communities, including tribes and community land grants**, to ensure access to sacred sites, ceremonies, and forest products. Protect, enhance, and to provide interpretation for our cultural resources.
- Provide and enhance **sustainable and community-centered recreation** opportunities by collaborating and leveraging resources.
- Support jobs, economic opportunities, excellent visitor and learning experiences, and critical public services through innovative and responsive youth engagement, outreach, special uses, and outfitter and guide programs.
- Ensure **sustainable rangelands and livestock grazing** to benefit producers and the resource.
- Protect and **maintain public access to the forest** for recreation, hunting, and traditional uses.

Contents of a Forest Plan

Forest Plan Components

Plan components guide future project and activity decision making, are required in the forest plan, and are the main substance of the document. They include desired conditions, objectives, standards, guidelines, suitability of lands, and goals. Plan components should (1) provide a strategic and practical framework for managing the Santa Fe NF, (2) be applicable to the resources and issues of the forest, and (3) reflect the forest's distinctive roles and contributions. As a whole, the set of plan components must provide for social, economic, and ecological sustainability and multiple uses. Plan components were developed collaboratively with input from a variety of external and internal stakeholders, with broad interdisciplinary representation. Plan components may be used to carry out laws, regulations, or policies and although the Plan does not need to reiterate existing law, regulation, or policy, some is repeated here for emphasis. Except for desired conditions, other plan components are not necessarily in every resource section. An interdisciplinary team refined the final form and organization of the forest plan to be understandable, useable, and integrated. The six plan components are described as:

Desired Conditions describe the vision for the Santa Fe NF. They are the ecological, cultural, and socioeconomic aspirations toward which management of the land and resources of the plan area is directed. They are not commitments or final decisions approving specific projects or activities; rather, they guide the development of projects and activities. Projects are designed to maintain or move toward desired conditions and to be consistent with the plan over the long term. The desired conditions in this forest plan have been written to contain enough specificity so that progress toward their achievement may be determined. In some cases, desired conditions may already be achieved, while in other cases, they may only be achievable over hundreds of years.

Objectives describe how the Santa Fe NF intends to move toward the desired conditions. Objectives are concise projections of measurable, time-specific, and fiscally achievable intended outcomes. Objectives have been established for the work considered most important to address the needs for change and make progress toward desired conditions. They also provide metrics for evaluating accomplishments.

Standards are technical design constraints that must be followed when an action is being taken to make progress toward desired conditions. Along with guidelines, standards make up the "rules" that the Santa Fe NF must follow. Standards differ from guidelines in that standards do not allow for any deviation without a plan amendment.

Guidelines are required technical design features or constraints on project and activity decision making that help make progress toward desired conditions. Along with standards, guidelines make up the "rules" that we must follow. However, different from standards, guidelines allow for departure from their terms, so long as the intent of the guideline is met. Deviation from a guideline must be specified in the site-specific National Environmental Policy Act (NEPA) decision document or the project's record with the supporting rationale. When deviation from a guideline does not meet the original intent, a plan amendment is required.

Suitability of lands means specific NFS lands within the plan area are identified as suitable for various multiple uses or activities based on the desired conditions applicable to those lands. The plan will also identify lands within the plan area as not suitable for uses that are not compatible with desired conditions for those lands. The suitability of lands need not be identified for every use or activity.

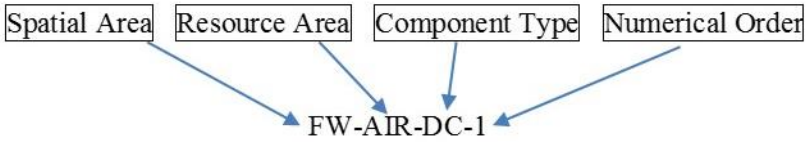
Every plan must identify NFS lands that are not suitable for timber production. In this plan, only lands that are and are not suitable for timber production have been determined. Although there is no suitability determination for other resources, the application of other plan components, in particular standards and guidelines, helps address where multiple uses or activities are appropriate in the plan area.

Goals are broad statements of intent, other than desired conditions, usually related to process or interaction with the public. Goals are expressed in broad, general terms, but do not include completion dates like an objective. Plans are not required to include goals, and none have been created here.

Forest Plan Coding

The forest plan displays plan components in text boxes to distinguish them from other sections of the plan. The forest plan also uses a unique coding system to reference plan components more easily and where the plan components apply using the following pattern: AA-BBB-CCC-NN. The series of letters before the first dash references the spatial area either Forestwide (FW), DA (Designated Area), MA (Management Area), or GA (Geographic Area). The second series of letters references the resource area, management area, or geographic area names (table 1). The third series of letters references the type of plan components (DC for Desired Condition, O for Objective, S for Standard, G for Guideline) and MA for management approaches. The number (##) is the sequential order of each plan component within that resource area.

So, the unique coding for Forestwide (FW) Air Resource (AIR) Desired Conditions (DC) number one (1) is FW-AIR-DC-1.



Where Plan Components Apply

In the Plan, plan components can apply to the entirety of the Santa Fe NF or to specific parcels of land. Forestwide plan components are those that apply to the entire forest unit. These are outlined in chapter 2 of this document. Plan components for designated areas, management areas, and geographic areas apply only to those specific parcels of land. These are outlined in chapter 3 of this document. Plan components for a designated, management, or geographic area may differ from forestwide guidance and must provide for appropriate management of the indicated area, based on the applicable authorities and the specific purposes for which the area was identified. Within the boundaries of any designated, management, or geographic area, direction provided for the area takes precedence over forestwide direction. Where specific direction is silent for the area, but exists in forestwide plan components, the forestwide direction applies.

Table 1. Resource areas and area names coding acronyms

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

Other Required Forest Plan Content

- Distinctive Roles and Contributions of the Santa Fe NF – earlier in chapter 1
- Describes the Santa Fe NF's distinctive contributions to the local area, region, and Nation, and the roles for which the forest is best suited, considering the agency's mission and capabilities.
- Priority Watersheds – Chapter 2, under "Water Resources"

  Priority watersheds have been identified using the Forest Service National Watershed Condition Framework (WCF) as areas where plan objectives for restoration focus on maintaining or improving watershed condition. WCF classifications and priority watersheds may change over the life of the forest plan, reflecting changes in watershed conditions.

- Forest Plan Monitoring – Chapter 5

  Monitoring includes testing assumptions, tracking changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives.

- Proposed and Possible Actions – Appendix D

  Possible actions are the types of projects that the forest may use in the next 3 to 5 years to move toward achieving desired conditions and objectives.

Optional Plan Content

A forest plan may also include "optional content," such as background information, explanatory narrative, general management principles, potential management approaches, management challenges, performance history, performance risks, contextual information, or referenced material. Optional content is not labeled or worded in a way that suggests it is a plan component and does not imply or constitute a decision, but it may help clarify plan direction and how it may be applied.

Management approaches may be used to inform future proposed and possible actions. These techniques and actions provide options for plan implementation, and represent possibilities, preferences, or opportunities, rather than obligatory actions. Not all plan components are addressed with management approaches, only those for which additional information is warranted. They may illustrate suggestions as to how desired conditions or objectives could be met, convey a sense of priority among objectives, or indicate possible future course of change to a program.

A change to "other required plan content" or "optional content" does not require a plan amendment; instead, such changes may be made using an administrative correction process.

Best Available Scientific Information Applied in Developing the Forest Plan

We used the best available scientific information to inform the planning process. The planning record documents how the information was determined to be accurate, reliable, and relevant to issues being considered. Best available scientific information includes relevant ecological, social, and economic scientific information. We documented the use of best available scientific information for the assessment, the plan decision, and the monitoring program in the assessment, draft environmental impact statement, and planning record. The 2012 Planning Rule does not require that planning develop additional scientific information, but that planning should be based on scientific information that is already available. New studies or the development of new information is not required for planning unless required by other laws or regulation. In the context of the best available scientific information, "available" means that the information currently exists in a form useful for the planning process, without further data collection, modification, or validation. Analysis or interpretation of the best available scientific information may be needed to place it in the appropriate context for planning.

Developing this final forest plan was an interactive process using best available scientific information, regional guidance, internal feedback, and collaboration with a wide variety of government agencies, federally recognized tribes, non-governmental organizations, and the public.

Public Participation in the Forest Plan

Public involvement, a point of strong emphasis in the 2012 Planning Rule (36 CFR 219), has been invaluable throughout the development of the Santa Fe NF final forest plan. In revising the forest plan, we sought to build on existing engagement with its many public stakeholders through conservation education, working agreements, partnerships, and volunteers. Throughout plan revision, we collaborated with the general public and our cooperating agencies, as well as Federal, State, and local governments, federally recognized tribes and pueblos, rural historic communities, land grant-merced and acequia governing bodies, rural historic communities, non-profit organizations, private landowners, youth, and the public.

In particular, cooperating agencies, various Federal, State, local, and Tribal governmental entities that lend technical assistance or other resources to the development of the final forest plan, contributed their knowledge and understanding of the concerns and needs of local communities in northern New Mexico to the plan revision process. Cooperating agencies often serve as a conduit representing the interests and needs of their constituents in the development of the draft proposed plan. Especially at technical meetings, but also at general public meetings, cooperating agencies engaged in discussions and provided input regarding pre-draft and draft work products with the national forest through discussions with other cooperating agencies, nongovernmental groups, and the general public.

The Santa Fe NF conducted public outreach meetings during the various phases of the planning process including Listening Sessions (2014), USDA cadre meetings (2014), Assessment (2014), need for change (2015), field trips (2016), initial plan components (2017), alternatives and management areas (2017), wilderness recommendation process (2016–2018), and open houses leading up to the draft plan and DEIS release (2016–2018). To date, this process has included over 250 meetings with at least 3,200 participants. Conversations at these meetings and comments submitted throughout this process influenced this entire document. It is our hope that this has led to a forest plan where the people who use and love the Santa Fe NF can see themselves.

After the final forest plan is finalized, the Santa Fe NF will continue to build on the successful collaboration established throughout forest plan revision in future planning and decision-making activities. The final forest plan will empower a more strategic use of existing partnerships that better aligns the interests of partners and the public, and helps to create new and more effective partnerships.

Forest Plan Implementation

Project-level planning is the mechanism for plan implementation. Project planning translates the desired conditions and objectives in the plan into proposals that identify specific actions, design features, and project-level monitoring. Projects address site-specific needs developed locally with input from experts and stakeholders and consideration of the most current and relevant information. Project decisions are made following public involvement and analysis. Important considerations in project development include consistency with the plan, consistency with higher-level direction, project potential effects on moving toward desired conditions at multiple scales, and feedback from project- and plan-level monitoring regarding the effectiveness of management strategies.

Forest projects and activities are to be consistent with the direction in this plan and compliant with current law, regulation, and policy. This plan does not reiterate higher-level direction; instead, it includes a partial list of applicable laws, regulations, executive orders, and policy for reference in appendix E.

To ensure a project is consistent with the plan, its design and implementation should consider its setting; any designated, management, or geographic areas it overlaps; and plan guidance related to any resources or conditions that may be present in the area (e.g., cultural resources, nonnative species, geologic formations, wildlife, etc.). Additionally, project planners should consider potential conflicts with other authorized projects and activities. Project design should be consistent with forestwide plan direction except where superseded by designated or management area direction, which takes precedence.

Plan- and project-level monitoring and evaluation are the tools for gathering information on progress toward desired conditions, the effectiveness of plan implementation, and the appropriateness of plan direction. This information is subsequently used to determine management needs and adjust management strategies, which, in part, determine the form of future projects and activities. As such, monitoring and evaluation are key elements of plan implementation, as they guide future management occurring under the plan. The monitoring plan contained in chapter 5 of this document, in conjunction with project-level monitoring, will provide the framework to support adaptive management on the Santa Fe NF.

Interrelationships of Forest Plan Content

This forest plan is not an assemblage of program plans with unique plan components for every resource. It is important that resource plan components are considered as a whole and combined to meet the requirements for ecological integrity, diversity of plant and animal communities, multiple-use management, and ecologically sustainable production of goods and services, and that they contribute to economic and social sustainability. All of these requirements go hand-in-hand.

To effectively manage to the desired conditions of a forest resource, project planners and decision makers must ensure they use the entire plan and not just the plan components listed for a single resource. Effective integrated resource management recognizes the interdependency of ecological, social, cultural, and economic resources and how management of one resource can influence the management or condition of other resources.

Consistency of Projects with the Forest Plan

As required by the National Forest Management Act, all projects and activities authorized by the Forest Service, after record of the decision for the draft plan, must be consistent with the forest plan (16 U.S.C. 1604(i) as described at 36 CFR 219.15). This is accomplished by a project or activity being consistent with applicable plan components. If a proposed project or activity is not consistent with the applicable plan components, the responsible official has the following options (subject to valid existing rights):

- Modify the proposed project or activity to make it consistent with the applicable plan components;
- Reject the proposal or terminate the project or activity;
- Amend the plan so that the project or activity will be consistent with the plan as amended; or

- Amend the plan contemporaneously with the approval of the project or activity so that the project or activity will be consistent with the plan as amended. This amendment may be limited to apply only to the project or activity. (36 CFR 219.15(c))

The following criteria should be used in determining if a project or activity is consistent with the forest plan (36 CFR 219.15(d)):

Desired conditions and objectives. A project is consistent with plan desired conditions and objectives when it:

Maintains or makes progress toward attaining one or more plan desired condition or objective applicable to the project;

Does not foreclose the opportunity to maintain or achieve any of the applicable desired conditions or objectives over the long term, even if the project (or an activity authorized by the project) may have an adverse short-term effect on one or more desired conditions or objectives; or

Maintains or makes progress toward attaining one or more of the plan's desired conditions, or objectives, even if the project or activity would have an adverse but short-term effect on other desired conditions or objectives.

> Many types of projects and activities can occur over the life of the plan and it is, therefore, not likely that a project or activity can maintain or contribute to the attainment of all desired conditions. In addition, not all desired conditions would be relevant to every activity. Most projects or activities are developed specifically to maintain or move conditions toward one or more of the desired conditions in the plan. The project decision document should include an explicit finding that the project is consistent with the plan's desired conditions or objectives and briefly explain the basis for that finding. In providing this brief explanation, the project decision document does not need to explicitly address every desired condition or objective set forth in the plan. Rather, a general explanation is all that is needed, so long as the consistency finding is made based on a consideration of one of the four factors noted above.

Standards. A project or activity is consistent with a standard if the project or activity complies with the standard.

> The project documentation should confirm that the project or activity complies with all applicable plan standards. The responsible official may make a single finding of consistency with all applicable standards; there is no need for individual findings of consistency.

Guidelines. A project or activity must be consistent with all guidelines applicable to the type of project or activity and its location in the plan area. A project or activity can be consistent with a guideline in either of two ways:

The project or activity complies with the guideline as set out in the Plan, or

A project or activity design varies from the requirements of the guideline but is as effective in meeting the purpose of the guideline to contribute to the maintenance or attainment of relevant desired conditions and objectives.

> The project documentation should briefly explain how the project is consistent with the applicable plan guidelines. When the project is designed in compliance with all applicable guidelines, the project documentation should simply confirm that fact in a single finding of

consistency with all applicable guidelines. When the project varies from requirements of one or more applicable guidelines, the project documentation should explain how the project design effectively meets the purpose of the guidelines(s).

Suitability. A project with the purpose of timber production may only occur in an area identified as suitable for timber production (16 U.S.C. 1604(k)). Except for projects with a purpose of timber production, a project or activity can be consistent with plan suitability determinations in either of two ways:

The project or activity is a use for which the area is specifically identified in the plan as suitable, or

The project or activity is not a use for which the area is specifically identified in the plan as suitable, but is not a use precluded by a "not suitable" determination.

The project documentation should confirm that the project or activity conforms to items 1 or 2 above.

Any substantive changes to plan components require a plan amendment, with appropriate analysis as required under the NEPA. Administrative changes can be made without documentation of environmental effects, such as updates to data and maps, management approaches, and relevant background information; fixing typographical errors; or updating other required or optional content of a plan (content other than plan components). The public will need to be notified of all administrative changes to the forest plan.

Plans may have other content, such as, background, collaboration strategies, context, existing conditions, glossary, introduction, monitoring questions, other referenced information or guidance, performance history, performance measures, performance risks, program emphasis, program guidance, program priorities, possible actions, roles and contributions, management challenges, or strategies, but such other content are not matters to which project consistency is required.

Transition in the Implementation of the Forest Plan

The forest plan is used as a direction source for future projects, plans, and assessments. It is not expected that this new direction be used to reevaluate or change decisions that have been made under the previous forest plan. A smooth and gradual transition to the new forest plan is anticipated, rather than one that forces an immediate reexamination or modification of all contracts, projects, permits, or other activities that are already in progress and were enacted under the previous forest plan. As new project decision, contracts, permits, renewals, and other activities are considered, conformance to the new plan direction as described in the previous section is expected.

Adaptive Planning and Monitoring

Forest planning is a continuous process that includes (1) assessment; (2) plan development, amendment, and revision; and (3) monitoring. The intent of this forest planning framework is to create an integrated approach to the management of resources and uses, incorporate the landscape-scale context for management, allow the Forest Service to adapt to changing conditions, and improve management based on monitoring and new information.

An adaptive forest plan recognizes that there is always uncertainty about the future of natural systems and the timing and type of disturbances. Social conditions and human values regarding the management of national forests are also likely to change. Given that the setting for forest plan

implementation will be changing over time, the forest plan incorporates an effective monitoring program that is capable of detecting change, with an adaptive flexibility to respond to those detected changes. The forest plan monitoring program recognizes key management questions and identifies measurable indicators that can inform the questions. When conditions change beyond what was anticipated in the forest plan, a responsive process using narrow amendments can be used to adjust plans between revisions.

The planning framework creates a structure within which land managers and partners work together to understand what is happening on the land. It is intended to establish a flexible forest plan that allows the forest to adapt management to changing conditions and improve management based on new information and monitoring.

The forest plan monitoring phase comes after the forest plan has been revised. The monitoring phase includes:

Designing management activities proposed to implement the plan in a way that will yield specific information and support learning.

Analyzing monitoring results using scientific methods that reduce uncertainty and improve understanding of system behavior. Well-designed monitoring programs and management activities contribute to better scientific analysis of these results. Monitoring and analysis also evaluate progress toward achieving desired conditions and objectives of the plan and the assumptions used in developing the plan.

Learning from the results of the analysis and sharing how the results either confirm or modify the existing assumptions or provide feedback on management effectiveness. Learning is proactively shared with land managers and the public.

Adapting planning and management activities based on learning from the results of the analysis. This adaptation takes the form of modifying assumptions, models, data, and understanding of the system. This knowledge is then used to inform the planning process that leads to adjustment of plans and projects.

Chapter 2. Forestwide Plan Components

Introduction

Management of the Santa Fe NF involves many distinct resources that are also integrated with each other. In this chapter, each resource is presented in an individual section with management direction (plan decisions) and associated plan content (narratives and management approaches). Ecological resources such as vegetation, soil, water, air, and wildlife are presented first. Socioeconomic resources—timber (forest products), grazing, cultural resources and traditions, and recreation—are presented in the second half of this chapter. In the middle of this chapter, a partnerships section emphasizes the importance of relationships in forest management. Despite this resource-by-resource structure, it is important to recognize that resources impact each other and forest uses in a complex and integrated way. Therefore, it is crucial that the plan be considered as a whole and not as a compilation of individual resource guidance.

Vegetation – Ecological Response Units

"The Santa Fe NF has a whole range of ecosystems – desert to above tree line."

(Public comment during the Assessment, spring 2014)

"Hiking with vanilla air in Ponderosa Pine stands."

(Public comment during the Assessment, spring 2014).

The Santa Fe NF encompasses a broad range of ecosystems, including a diversity of vegetative ecosystems, ranging along elevational gradients from prairie grasslands to alpine tundra. These ecosystem types are mapped on the Santa Fe using the ecological response unit (ERU) framework. (ERUs are mapped ecosystem types based on biophysical themes that represent the range of conditions (e.g., dominant species, vegetation associations, soils, landscape features, or climate) that prevail under natural disturbance regimes (e.g., fire, insects and disease). Each ERU has specific seral stages that describe smaller units of vegetation conditions and succession (e.g., dominance of post-disturbance species or closed-canopy conditions) that is influenced by both natural processes and management. The seral state proportions given within the desired conditions described for each ERU individually are single values reflecting the seral proportions indicative of reference conditions (LANDFIRE 2010).

Fire exclusion and past management activities have led to departure in seral state distributions, patch sizes, and stand compositions from historical reference conditions for many ERUs on the Santa Fe NF. Former practices of selective high-grade logging, overgrazing, fragmentation (roads, trails, railroad systems), and fire suppression and exclusion have contributed to the highly departed conditions for most ERUs in the forest. These past activities have produced highly stressed ecosystems, higher densities of small-diameter trees, increased closed-canopy conditions, increased fuel loadings, altered species composition, and have reduced site productivity. These conditions have lowered the resilience of these ecosystems, making them more at risk from stressors (e.g., prolonged drought, nonnative invasive species, climate fluctuations) and disturbance (e.g., more large uncharacteristic fires, increased incidence of insects and disease outbreaks).

Management direction is described for the forest at large (all ERUs) and for individual ERUs. Desired conditions for ERUs are presented at three spatial scales[3]: landscape scale, mid-scale, and fine-scale (figure 2). Descriptions begin with the landscape scale to provide a "big picture" of the desired conditions across the larger land area (typically composed of variable elevations, slopes, aspects, soils, plant associations, and disturbance processes). Assemblages of mid-scale units comprise a landscape area. Descriptions at the mid- and fine-scales provide additional detail necessary for guiding future projects and activities. The mid-scale is composed of assemblages of fine-scale units, which have similar biophysical conditions. The fine-scale is an area in which the species composition, age, structure, and distribution of plants (single, grouped, or aggregates of groups) are described. Vegetation descriptions at these scales provide adequate detail and guidance for designing projects and activities that will help achieve the desired conditions over time. For some ERUs (e.g., montane subalpine grasslands, Colorado Plateau Great Basin grasslands) relevant scientific information is more limited, resulting in less applicable information for desired conditions at multiple scales.

Descriptions for each ERU include a range of conditions (e.g., grass and forb cover ranges from 10 to 25 percent, on average, for a specific seral state) for desired conditions. No one individual project is anticipated to reach these targets (conditions vary based on site potential), but individual projects should be designed in a manner that helps to drive the ecosystem overall toward the desired conditions. Moreover, the culmination of multiple projects and averaged conditions across the forest, over time, is anticipated to drive the ecosystems and ERUs toward the targets or ranges for desired conditions.

Vegetation provides a number of supporting, regulating, and provisioning ecosystem services. High biodiversity and genetic variation among plant communities supports regulating ecosystem services and ecosystem resilience. Vegetation cover supports water filtration, clean water, soil function, and nutrient cycling, especially from plant matter and decomposition. Species composition and vegetation structure are also important to wildlife (e.g., dead snags for cavity-nesting birds; old growth for spotted owls and bats). Other important ecosystem services include the regulation of climate through carbon sequestration and storage, and the production of oxygen through plant respiration, food and wood products, and aesthetic and cultural values.

[3] Size and ranges (in acres) for each spatial scale is different by system type (forest, woodland, shrubland, grassland) and for wetland ecosystems. The size and ranges for each spatial scale are specified in each ERU section of the plan.

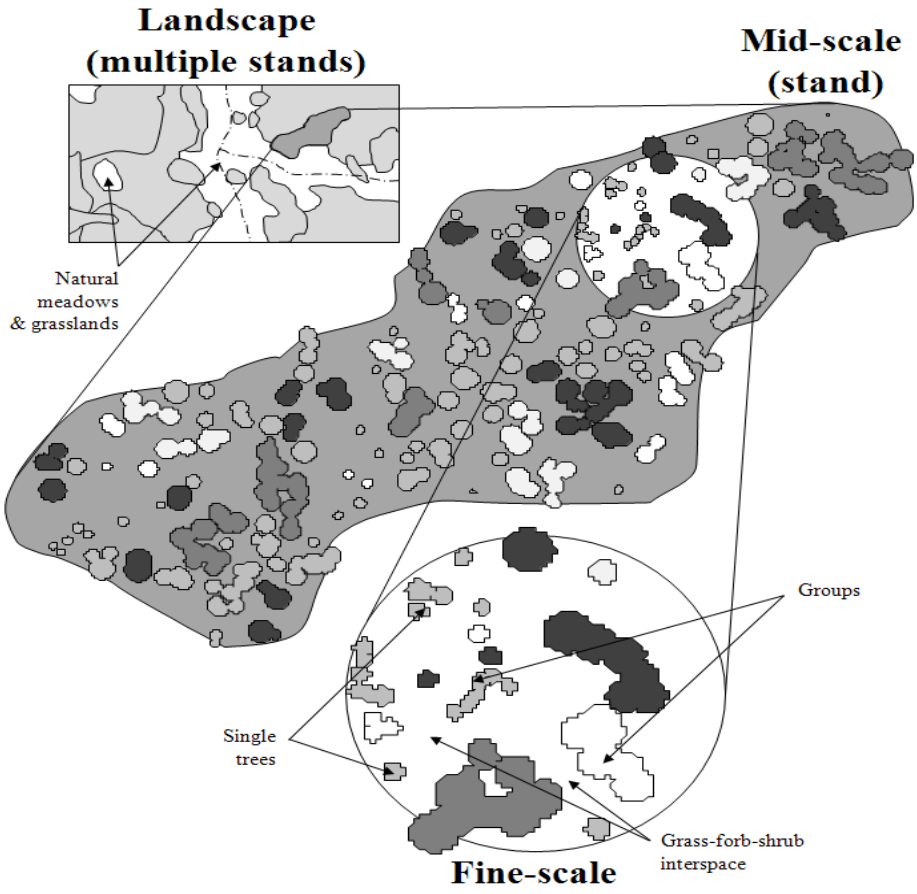


Figure 2. Spatial scales of analysis for vegetation

All Vegetation Types (ERUs)

Desired Conditions for All Vegetation Types **(FW-VEG-DC)**

1 Ecosystems maintain all of their essential components (e.g., plant density, species composition, structure, coarse woody debris, and snags), processes (e.g., disturbance and regeneration), and functions (e.g., nutrient cycling, water infiltration, and carbon sequestration).

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

2 Ecosystems are resilient or adaptive to the frequency, extent, and severity of disturbances, such as fire in fire-adapted systems, flooding in riparian systems, insects, pathogens, and climate variability.

- a The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances, and to climate variability.
- b Vegetative communities reflect their natural physical, chemical, and biophysical processes with carefully managed human influence.
- c Non-climate ecosystem stressors (e.g., high road densities, water depletions, and air and water pollution) do not significantly impact the resilience and resistance of an ecosystem's ability to adapt to a changing climate.

d Natural disturbance regimes, including fire, are allowed to function in their natural ecological role. Uncharacteristic fire (frequency and severity outside historical range for associated vegetation type) is minimal or absent on the landscape.

e Landscape vegetation structure and patterns create a mosaic that disrupts large continuous areas of uncharacteristic high-severity fire effects.

f Healthy, resilient vegetation contributes to the forest's ability to store carbon and function as a sustainable carbon sink.

3 The ecological attributes and processes that provide habitat for native biota and/or historic and cultural values are maintained or restored.

a A diversity of vegetation exists with a mosaic of cover types and stand structures forming a healthy, resilient landscape that provides for genetic exchange, habitat connectivity for daily and seasonal movements of animals, including inter-specific interaction at all trophic levels, (e.g., producer-consumer and predator-prey interactions) across multiple spatial scales, consistent with existing landforms and topography.

b Vegetation provides a sustainable supply of timber and other forest products, such as firewood, piñon nuts, vigas and latillas, herbs, and forage, consistent with desired conditions for other resources.

c Habitats and refugia for rare, endemic, and culturally important species, are resilient to stressors and support species' persistence and recovery.

Objectives for All Vegetation Types **(FW-VEG-O)**

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

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

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

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

Guidelines for All Vegetation Types **(FW-VEG-G)**

1 Management activities should favor the retention of species that naturally occurred in those ecosystems. Native species should be present in the relative proportions characteristic of those ecosystems.

2 Heavy equipment and log decks should not be staged in ecologically sensitive areas (e.g., riparian corridors, montane meadows, and highly erosive soils).

3 In proposed treatment areas with impaired understory vegetation, treatments should be used that improve herbaceous vegetation growth, soil and watershed condition, and increase soil productivity and site-specific vegetation structure.

4 Vegetation treatments should be designed such that structural stages and age classes that are under-represented in desired conditions become proportionally represented, and to assure continuous recruitment of old growth characteristics across the landscape over time.

5 In open grasslands and meadows or in degraded sagebrush shrublands, new stock tanks or wildlife waterers should be strategically placed to improve animal distribution and reduce trampling impacts.

Management Approaches for All Vegetation Types (**FW-VEG-MA**)

1. Consider management actions that replicate natural disturbance regimes.
2. In support of restoration activities, consider using seeds or planting stock that is adapted to the ecological unit (or similar in elevation, soil type, and ecosystem) and to potential future conditions, to build resiliency in vegetative communities.
3. In site-specific cases, consider scheduling management activities that result in accumulations of green slash to minimize potential impacts from bark beetles and avoiding accumulating green slash (greater than 3 inches in diameter) before overwintering beetles emerge (generally April to June) in areas highly susceptible to outbreaks.

Spruce Fir

The spruce-fir forest (SFF) vegetation community generally occurs at elevations ranging from approximately 9,500 to nearly 12,000 feet on Tesuque Peak. It is often dominated by Engelmann spruce, but contains other species depending on elevation. SFF occurs on the coldest and highest elevation sites in the forest with the most precipitation. This forest vegetation community can be subdivided into lower elevation (spruce-fir mix) and upper elevation (subalpine spruce-fir) spruce-fir types, with differing fire regimes and subdominant species composition. The lower spruce-fir type typically occurs between 9,500 and 10,500 feet in elevation, while the upper spruce-fir type typically occurs between 10,500 and about 11,500 feet in elevation and is bounded, where present, by the alpine tundra vegetation above 11,500 feet.

Lower-elevation spruce-fir resembles wet mixed conifer with a different composition of tree species, due to relatively warmer, drier conditions, and is a transition zone between wet mixed conifer and the upper-elevation spruce-fir forest type. In the lower type, common seral tree species are aspen, Douglas-fir, white fir, and southwestern white or limber pine. Late seral forest is dominated by Engelmann spruce, white fir, and occasionally blue spruce. Subdominant species may include corkbark (subalpine fir), white fir, and bristlecone pine. In the upper type, dominant tree species are Engelmann spruce, corkbark fir (subalpine fir), but fir may be absent in the colder locations. Patches of aspen are occasionally present, but aspen is typically incidental or co-dominant. Occasional bristlecone pine is also present in the upper elevations. Disturbances in these types typically occur at two temporal and spatial scales: large-scale infrequent disturbances (mostly fire) and small-scale frequent disturbances (fire, insect, disease, and wind). On the Santa Fe NF, SFF currently falls into fire regime condition class (FRCC) 2 and has a historic fire return interval of 200 to 400 years (SFNF Assessment 2016).

Desired Conditions for Spruce-Fir **(FW-SFF-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 SFF vegetation community is composed of multiple species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns, with groups and patches of variably sized and aged trees. Tree canopies are generally more closed than in mixed conifer forests. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

a Seral state proportions for SFF are:

Seral Stage	Seral Stage (percentage of ERU)	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, forb, shrub	9	Non-tree: Recently burned; grass, forb, and shrub types	N/A	Less than 10% tree cover
Aspen	11	All aspen/mixed deciduous tree types	All size classes	All cover classes, all storiedness
Early	21	Seedling/sapling	0-9.9"	10 to >30% tree cover, all storiedness
Mid	14	Medium large, closed and open canopy	10-19.9"	10 to >30% tree cover, all storiedness
Late	45	Large trees, closed canopy	Greater than 20"	Greater than 30% tree cover, 1-2 stories or more than 3

b Patches of SFF vary, but most are hundreds of acres with rare patches that are thousands of acres, as a result of periodic disturbances (e.g., infrequent stand-replacing fire and bark beetle outbreaks).

c Old growth generally occurs over large areas as stands or forests. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance.

d Vegetation community is composed predominantly of vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provides snags and coarse woody debris, all well-distributed throughout the landscape. The number of snags and number of downed logs (larger than 12-inch diameter at mid-point, more than 8 feet long) and coarse woody debris (over 3-inch diameter) vary by seral stage.

e Snags, 18 inches or larger at dbh, range from 5 to over 30 snags per acre, with the lower range of snags associated with early seral stages and the upper range associated with late seral stages. Snag density in general (larger than 8 inches dbh) averages 20 per acre with a range of 13 to 30.

Landscape Scale (1,000 to 10,000+ acres)

f Coarse woody debris, including downed logs, averages vary by seral stage, ranging from 5 to 30 tons per acre for early-seral stages; 30 to 40 tons per acre for mid-seral stages; and 40 or more tons per acre for late-seral stages.

2 Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Fires and other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

a Organic ground cover and herbaceous vegetation provide protection of soil and moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. The understory consists of native grass, forbs, and shrubs. In the lower spruce-fir type, shrub cover is variable and depends on Terrestrial Ecosystem Unit Inventory (TEUI) unit and plant composition similarity to site potential (e.g., FSH 2090.11) averages greater than 66 percent at the plan unit scale, but can vary considerably at finer scales.

b Mixed- and high-severity fires occur in spruce-fir forests with frequencies longer than 200 years varying with elevation. In the lower spruce-fir type, mixed-severity fires (Fire Regime III) infrequently occur. In the upper spruce-fir type, high-severity fires (Fire Regimes IV and V) occur very infrequently. Most fires are of limited scale and variable intensity. Natural and human-caused disturbances are sufficient to maintain natural processes and conditions.

c Isolated instances of insect and disease infestations (e.g., Douglas-fir tussock moth, tent caterpillar) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of spruce-fir forests.

Mid-scale (10 to 1,000 acres)

3 At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. There may also be small disturbances resulting in groups and patches of tens of acres or less. Grass-forb-shrub interspaces created by disturbance may involve single trees or comprise the entire mid-scale area after a major disturbance. Aspen is occasionally present in large patches.

4 Density ranges from 20 to 250 (or more) square feet per acre basal area based on age and site productivity, and depending on disturbance and seral stages of the groups and patches.

5 Ground cover consists of shrubs, perennial grasses, and forbs with basal vegetation cover values ranging between 5 and 20 percent, depending on the site potential and TEUI unit.

Mid-scale (10 to 1,000 acres)

6 Mixed (Fire Regime III) and high (Fire Regime IV and V) severity fires and other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

7 Forest conditions in goshawk post-fledging family areas are similar to general forest conditions, except they typically contain 10 percent or more tree density (basal area) than goshawk foraging areas and the general forest. Nest areas have multi-aged forest conditions, with more dominant large trees and relatively denser canopies than other areas in the spruce-fir type.

Fine-scale (less than 10 acres)

8 In early group or patch development, trees are generally the same height and age, but may be multilayered in late development. In mid-aged and older forests, trees grow tightly together with interlocking crowns.

9 Gaps are present as a result of natural disturbances (e.g., insects, blowdowns).

Mixed Conifer with Aspen

The mixed conifer with aspen forest (wet mixed conifer, MCW) vegetation community generally occurs at elevations ranging from approximately 9,000 to 11,000 feet. MCW stands typically occur on north and east aspects, lower slopes, and forested valley bottoms, and are more common at high elevations. Tree species composition varies depending on seral stage, elevation, and moisture availability. It can be composed of early and mid-seral species such as aspen, Douglas-fir, New Mexico locust, southwestern white pine and limber pine, and late seral species such as maple, white fir, and blue spruce. Ponderosa pine may be present in minor proportions. The absence or limited occurrence of Engelmann spruce and corkbark fir distinguishes wet mixed conifer from the spruce-fir forest. This forest has an understory of a wide variety of shrubs, grasses, and forbs depending on soil type, aspect, elevation, disturbance, and other factors. Disturbances typically occur at two temporal and spatial scales: large-scale infrequent disturbances (primarily fire), and small-scale frequent disturbances (fire, insect, disease, wind). On the Santa Fe NF, MCW currently falls into fire regime condition class (FRCC) 2 and has a fire return interval of 35 to over 200 years (SFNF Assessment 2016).

Stands generally have dense structure and dominant and co-dominant vegetation varies in elevation and moisture availability, and by seral stage. Ponderosa pine occurs incidentally or is absent, while Douglas-fir, southwestern white pine, white fir, and Colorado blue spruce occur as dominant and or co-dominant conifer species. Limber pine may be present in subdominant proportions.

Desired Conditions for Mixed Conifer with Aspen **(FW-MCW-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 The MCW vegetation community is composed of multiple species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns with groups and patches of variably-sized and aged trees and other vegetation associations. Tree canopies are generally more closed than in dry mixed conifer.

Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

a Seral state proportions for MCW are:

Seral Stage	Seral Stage Percent of ERU	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, forb, shrub	7	Non-tree: Recently burned; grass, forb, and shrub types	N/A	Less than 10% cover
Aspen	21	All aspen/mixed deciduous tree types	All size classes	All cover classes, all storiedness
Early	18	Seedling/sapling	0-9.9”	10 to >30% tree cover, all storiedness
Mid	14	Medium large, closed and open canopy	10-19.9”	10 to >30% tree cover, all storiedness
Late	40	Large trees, closed canopy	Greater than 20”	Greater than 30% tree cover, 1-2 stories or more than 3

Landscape Scale (1,000 to 10,000+ acres)

b Patches are composed of variable species based on seral stages. Patch sizes vary, but are frequently hundreds of acres, with rare patches that are thousands of acres, as a result of infrequent disturbances.

c Old growth generally occurs over large areas as stands or forests where the location shifts on the landscape over time as a result of succession and disturbance. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity.

d MCW communities are predominately vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provide snags and coarse woody debris, all well-distributed throughout the landscape. Number of snags and downed logs (larger than 12-inch diameter at mid-point, over 8 feet long) and coarse woody debris (more than 3-inch diameter) vary by seral stage.

e Snags 18 inches or larger at DBH range from 1 to 5 snags per acre, where the lower range of snags of this size is associated with early seral stages and upper range is associated with late seral stages. Snag density in general (larger than 8 inches at dbh) averages 20 per acre. Coarse woody debris including downed logs, varies by seral stage, with averages ranging from 5 to 20 tons per acre for early-seral stages; 20 to 40 tons per acre for mid-seral stages; and 35 tons per acre or greater for late-seral stages.

f The understory consists of native grass, forbs, and shrubs. Shrub cover depends on the TEUI unit. At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at finer scales due to a diversity of seral conditions.

2 Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. Natural and human-caused disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

a Mixed and high-severity fires occur in MCW, with a fire return intervals of 35 to 200 years or more (Fire Regimes III, IV, and V). Mixed-severity fire (Fire Regime III) is characteristic at lower elevations of this type. High-severity fires (Fire Regimes IV and V) are typically at higher elevations of this type, but rarely occur.

b Isolated instances of insect and disease infestations (e.g., spruce budworm, Douglas-fir tussock moth, dwarf mistletoe, or tent caterpillar) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of MCW.

Mid-scale (10 to 1,000 acres)

3 At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity (e.g., reference conditions indicate patches of 100 to 400 acres). Groups and patches of trees tens of acres or less are common, and are primarily even-aged. A mosaic of groups and patches vary in species composition, age, and size. Openness and prevalence of some species (e.g., aspen) is dependent on seral stages. Aspen is occasionally present in large patches. Grass-forb-shrub openings created by disturbance may comprise 10 to 100 percent of the mid-scale area, depending on the type of and time since disturbance.

4 Density ranges from 20 to 180 (or greater) square feet per acre basal area based on age and site productivity, and depending on time since disturbance and seral stages of the groups and patches.

5 Fire severity is mixed or high, with a return interval of 35 to over 200 years. Fires maintain overall desired tree density, structure, species composition, coarse woody debris, and nutrient cycling. During moister conditions, fires exhibit smoldering, low-severity surface intensity, with single tree or isolated group torching. Under drier conditions, fires exhibit passive to active crown fire behavior, with conifer mortality of up to 100 percent across mid-scale patches. High severity fires generally do not exceed 1,000-acre patches of mortality. Other small disturbances occur more frequently.

6 Ground cover consists of shrubs, perennial grasses, and forbs with basal vegetation cover values ranging between 5 and 20 percent depending on site potential and TEUI unit.

7 Forest conditions in goshawk post-fledging family areas are similar to general forest conditions, except they typically contain 10 percent or higher tree density (basal area) relative to post-fledging family areas than goshawk foraging areas and the general forest. Nest areas have multi-aged forest conditions, with dominant large trees and relatively denser canopies than other areas in the MCW type.

Fine-scale (less than 10 acres)

8 In mid-aged and older forests, trees are typically variably-spaced with interlocking (grouped and clumped trees) or nearly interlocking crowns. Trees within groups can be of similar or variable species and ages. Small openings are present as a result of disturbances.

9 Due to presence of ladder fuels, fires usually burn either with low intensity, smoldering combustion, or transition rapidly in the canopy as passive or active crown fire.

10 Organic ground cover and herbaceous vegetation provide protection for soil and moisture infiltration, and contribute to plant diversity and ecosystem function.

Mixed Conifer-Frequent Fire

The mixed conifer-frequent fire (dry mixed conifer, MCD) forest vegetation community is transitional with increasing elevation between ponderosa pine and wet mixed-conifer forests and generally occurs at elevations ranging from approximately 8,500 to 10,500 feet, but can be found up to 11,100 feet. MCD forests are dominated by mainly shade-intolerant trees such as ponderosa pine, southwestern white pine, limber pine, quaking aspen, and Gambel oak, with a lesser presence of shade-tolerant species such as white fir and blue spruce. Mid-tolerant species such as Douglas-fir are common. Aspen may occur as individual trees or small groups. This forest vegetation community typically occurs with an understory of grasses, forbs, and shrubs.

Dominant and co-dominant vegetation varies in elevation, moisture availability, and by seral stage. Typically, these types were historically dominated by ponderosa pine, with minor occurrence of aspen, Douglas-fir, and southwestern white pine. More shade-tolerant conifers, such as Douglas-fir, white fir, and blue spruce tend to be present in late succession stands, depending on site potential. Fires within this forest type were historically frequent (FRI- 5 to 21 years) and predominately low to mixed severity (Fire Regime Group 1). On the Santa Fe, at the plan scale MCD currently falls into fire regime condition class (FRCC) 3 (SFNF Assessment 2016).

Desired Conditions for Mixed Conifer-Frequent Fire **(FW-MCD-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1	The MCD vegetation community is composed of multiple species of varying ages in a mosaic of seral stages and structures. The forest arrangement on the landscape is similar to historic patterns, with groups and patches generally of variably-sized and aged trees (uneven-aged) and occasional patches of even-aged structure interspersed within variably-sized openings of grass-forb-shrub vegetation. Denser tree conditions exist in some locations such as north-facing slopes and canyon bottoms. Canopies are generally more open than in mixed conifer with aspen stands. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

Landscape Scale (1,000 to 10,000+ acres)

a Seral state proportions for MCD are:

Seral Stage	Seral Stage Percent of ERU	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, forb, shrub – early	9	Non-tree: recently burned; grass, forb, and shrub types; seedling/sapling tree sizes	0-4.9"	All cover classes, all storiedness
Mid-Open	3	Small trees, open canopy	5-9.9"	10-29.9% tree cover, all storiedness
Mid-Closed	3	Small trees, closed canopy	5-9.9"	Greater than 30% tree cover, all storiedness
Late-Open	60	Medium to large trees, open canopy	10-19.9" and greater than 20"	10 to 30% tree cover, 3+ stories
Late-Closed	25	Medium to large trees, closed canopy	10-19.9" and greater than 20"	Greater than 30% tree cover, all storiedness

b Groups of MCD vary in size (although typically small groups), shape, number of trees per group, and number of groups per area across the landscape, creating a mosaic of patchiness. Where they naturally occur, groups of aspen and all structural stages of oak (e.g., Gambel oak) are present.

c MCD communities are composed predominantly of vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provide snags and coarse woody debris (more than 3-inch diameter), all well-distributed throughout the landscape. The understory consists of native grass, forbs, and shrubs.

d Old growth occurs throughout the landscape, generally in small areas as individual old-growth components or as clumps of old growth. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts across the landscape over time as a result of succession and disturbance.

2 Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity, and to climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Fire and other disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

a Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. Shrub cover depends on the TEUI unit and disturbance.

Landscape Scale (1,000 to 10,000+ acres)

b At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at fine- and mid-scales due to a diversity of seral state conditions.

c Dwarf mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures.

d Isolated instances of insect and disease infestations (e.g., spruce budworm, Douglas-fir tussock moth) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of MCD.

3 Frequent, low-severity fires (Regime I) are characteristic in this type, including throughout goshawk home ranges. Fire return interval is 5 to 21 years. Grasses, forbs, shrubs, needle cast (fine fuels), and small trees maintain the natural fire regime.

a Natural and human-caused disturbances are sufficient to maintain desired overall tree density, structure, species compositions, coarse woody debris, and nutrient cycling.

Mid-scale (10 to 1,000 acres)

4 At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area. Groups and patches of trees are primarily uneven-aged with all age classes and structures present. Disturbances sustain the overall variation in age and structural distribution. Occasionally small patches (generally less than 60 acres) of even-aged forest structure are present, based on disturbance events and regeneration establishment.

a A small percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand-replacement fire, and other disturbances.

5 Tree density within forested areas generally ranges from 30 to 125 square feet per acre basal area.

Openness typically ranges from 50 percent in more productive sites to 90 percent in the less productive sites. Following major disturbances, grass-forb-shrub interspaces may comprise 10 to 100 percent of the mid-scale areas, depending on the type and time of disturbance.

6 Snags are typically 18 inches or larger dbh and average 3 per acre. Smaller snags, 8 inches and larger dbh, average 8 snags per acre.

7 Coarse woody debris, including downed logs, typically range from 5 to 15 tons per acre. Downed logs (larger than 12-inch diameter at mid-point, over 8 feet long) average 3 per acre within forested areas of the landscape.

Mid-scale (10 to 1,000 acres)

8 Ground cover consists primarily of perennial grasses and forbs capable of carrying surface fire, with basal vegetation values ranging between about 5 and 20 percent, depending on site potential and TEUI unit. Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.

9 Forest conditions in goshawk post-fledging family areas are similar to general forest conditions, except they typically contain 10 to 20 percent higher basal area in mid-old age tree groups than goshawk foraging areas and the general forest. Nest areas have multi-aged forest conditions, with dominant large trees and relatively denser canopies than are common in the rest of the mixed conifer-frequent fire type.

Fine-scale (less than 10 acres)

10 Trees typically occur in irregularly shaped groups and are variably spaced with some tight clumps. Trees within groups are of similar or variable ages, and are of one or more species. Crowns of trees within mid-aged and old groups are interlocking or nearly interlocking.

11 Size of tree groups is typically less than 1 acre. Groups at the mid to old-age stages consist of 2 to approximately 50 trees per group, but are sometimes larger, such as on north-facing slopes. Regeneration openings occur as a mosaic and are similar in size to nearby groups.

12 Interspaces surrounding groups are variably shaped, are composed of a native grass-forb-shrub mix, and may contain individual trees or snags.

Ponderosa Pine

The ponderosa pine (PPF) forest vegetation community includes two sub-types: Ponderosa pine bunchgrass and ponderosa pine Gambel oak. The PPF vegetation community generally occurs at elevations ranging from approximately 6,000 to 9,000 feet, with ponderosa occurring predominantly in draws and on pumicious soils at lower elevations. PPF is dominated by ponderosa pine and commonly includes other species such as oak, juniper, and piñon. More infrequently, species such as aspen, Douglas-fir, white fir, and blue spruce may also be present, and may occur as individual trees. This forest vegetation community typically occurs with an understory of grasses and forbs, although it sometimes includes shrubs when associated with certain, often rocky, soil types.

Stands generally have an open structure (less than 30 percent tree cover). Dominant and co-dominant vegetation varies in elevation, moisture availability, and by seral stage. The dominant species in this system is ponderosa pine. Other woody species, such as Douglas-fir, white fir, blue spruce, Gambel oak, piñon pine, New Mexico locust, one-seed juniper, and Rocky Mountain juniper may be present.

Fires within this forest type were historically frequent (FRI- 4 to 30 years) and predominately low to mixed severity (Fire Regime Group 1). On the Santa Fe, at the plan scale PPF currently falls into fire regime condition class (FRCC) 3 (SFNF Assessment 2016).

Desired Conditions for Ponderosa Pine **(FW-PPF-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 The PPF vegetation community is composed of trees of varying ages in a mosaic of seral stages and structures. The forest arrangement on the landscape is similar to historic patterns, with groups and patches generally of variably-sized and aged trees (uneven-aged) and occasional patches of even-aged structure, interspersed within variably sized openings of grass-forb-shrub vegetation associations. Denser stand conditions exist in some locations, such as north-facing slopes and canyon bottoms. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

a Seral state proportions for PPF are:

Seral Stage	Seral Stage Percent of ERU	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, forb, shrub – early	2	Non-tree: recently burned; grass, forb, and shrub types; seedling/sapling tree sizes	0-4.9"	All cover classes, all storiedness
Mid-Open	2	Small trees, open canopy	5-9.9"	10-29.9% tree cover, all storiedness
Mid-Closed	2	Small trees, closed canopy	5-9.9"	Greater than 30% tree cover, all storiedness
Late-Open	82	Medium to large trees, open canopy	10-19.9" and greater than 20"	10 to 30% tree cover, 3+ stories
Late-Closed	12	Medium to large trees, closed canopy	10-19.9" and greater than 20"	Greater than 30% tree cover, all storiedness

Landscape Scale (1,000 to 10,000+ acres)

b Groups of PPF vary in size (although typically small (a few trees to 1+ acre))shape, number of trees per group, and number of groups per area across the landscape, creating a mosaic of patchiness. Where they naturally occur, in the Gambel oak sub-type, all structural stages of oak trees are present.

c The PPF vegetation community is predominantly composed of vigorous trees, but older declining, top-killed, lightning- and fire-scarred trees are a component that provides for snags and coarse woody debris (over 3-inch diameter), all well-distributed throughout the landscape.

d Old growth occurs throughout the landscape, generally in small areas (e.g., less than 1 acre) as individual old-growth components or as clumps of old growth. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts across the landscape over time as a result of succession and disturbance.

e Dwarf-mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures.

f Frequent, low-severity fires (Fire Regime I) are characteristic in this type, including throughout goshawk home ranges, with fire return intervals of 4 to 30 years. Fires burn primarily on the forest floor and do not spread between tree groups as crown fire. Grasses, forbs, shrubs, litter (e.g., cones, needles, fine woody fuels, 10-hour-fuels, and previous years' debris from grasses, forbs, and shrubs), and small trees maintain the natural fire regime.

2. Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, severity, and to climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Natural and human-caused disturbances are sufficient to maintain desired overall tree density, structure, species compositions, coarse woody debris, and nutrient cycling.

a Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. The understory consists of native grass, forbs, and shrubs. The amount of shrub cover depends on TEUI unit and disturbance. At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at finer scales due to a diversity of seral conditions.

b Isolated instances of insect and disease infestations (e.g., bark beetle and dwarf mistletoe) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of PPF.

Mid-scale (10 to 1,000 acres)

3 At the mid-scale, the size and number of tree groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Mosaics of tree groups and patches of trees make up an uneven-aged forest with all age classes present. Disturbances sustain the overall variation in age and structural distribution.

   a Occasionally small patches (generally less than 50 acres) of even-aged forest structure are present, based upon disturbance events and regeneration establishment.
   b A small percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand-replacement fire, and other disturbances.

4 Density within forested areas ranges from 22 to 89 square foot basal area per acre.

5 Openness typically ranges from 52 percent in more productive sites to 90 percent in less productive sites. In areas with high fine-scale aggregation of trees into groups, mid-scale openness ranges between 78 to 90 percent.

6 Ponderosa pine snags are typically 18 inches or larger at dbh and average 1 to 2 per acre. In the Gambel oak subtype, large oak snags (larger than 10 inches) are a well-distributed component.

7 Coarse woody debris, including downed logs, vary by seral stage but typically range from 3 to 10 tons per acre. Downed logs (larger than 12-inch diameter at mid-point, over 8 feet long) average 3 logs per acre within the forested area (not interspaces) of the landscape.

8 Ground cover consists primarily of perennial grasses and forbs capable of carrying surface fire, with basal vegetation values ranging between about 5 and 20 percent depending on site potential and the TEUI unit.

9 Fires burn predominantly on the forest floor and do not spread between tree groups as crown fire.

10 Forest conditions in goshawk post-fledging family areas are similar to general forest conditions, except they typically contain 10 to 20 percent higher basal area in mid- to old-age tree groups than goshawk foraging areas and the general forest. Nest areas have multi-aged forest conditions, with dominant large trees and relatively denser canopies than are common in other areas of the PPF type.

Fine-scale (less than 10 acres)

11 Tree groups are typically less than 1 acre in size, but average 0.5 acre and are sometimes larger on north-facing slopes. In mid-aged and older forests, groups consist of approximately 2 to 40 trees.

12 Trees typically occur in irregularly shaped groups and are variably-spaced with some tight clumps. Trees within groups may vary in age and sometimes contain species other than ponderosa pine. Crowns of trees within the mid- to old-age groups are interlocking or nearly interlocking.

13 Interspaces surrounding groups are variably shaped, are a native grass-forb-shrub mix, and may contain individual trees or snags.

Piñon-Juniper Grass and Juniper Grass

Piñon-juniper grass (PJG) occurs in what were historically more open woodlands with grassy understories (savannah-like conditions). Tree species include two-needle piñon, one-seed juniper, and occasional alligator juniper. Utah juniper also occurs on the Santa Fe, but is not as common as it is in areas farther north and west. Native understories are made up of predominantly cool season perennial grasses including muttongrass, squirreltail, and western wheatgrass combined with both annual and perennial forbs, while shrubs are absent or scarce (less than 1 percent cover). The PJG type is typically found on sites with well-developed, loamy soil characteristics, including gentle upland and transitional valley locations, where soil conditions favor grasses (or other grass-like plants) and other understory plants, but still support at least some tree cover. Juniper grass (JUG) is typically found in warmer and drier settings beyond the environmental limits of piñon pine, and just below and often intergrading with the piñon-juniper zone. A dense herbaceous matrix of native grasses and forbs characterize this type. Typical disturbances (fire, insects, and disease) are of low severity and high frequency. These disturbance patterns create and maintain the uneven-aged, open-canopy nature of this type. Typically, native understory grasses are perennial species, while forbs consist of both annuals and perennials. Common native grasses include ring muhly, blue grama, and sideoats grama. Shrubs are characteristically absent or scattered. This type is typically found on sites with well-developed, shallow to moderately deep loamy soil characteristics, generally at the drier edge of the woodland climatic zone. Generally, these types are most extensive in areas dominated by warm (summer) season or bi-modal precipitation regimes.

Desired Conditions Piñon-Juniper Grass and Juniper Grass **(FW-JUG-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1	The PJG and JUG vegetation communities are composed of trees of varying ages in a mosaic of seral stages and structures. The forest arrangement on the landscape is similar to historic patterns, with groups and patches generally of variably-sized and aged trees (uneven-aged) and occasional patches of even-aged structure, interspersed within variably-sized openings of grass/forb/shrub vegetation associations. Denser stand conditions exist in some locations, such as north-facing slopes and canyon bottoms. Canopies are more open than in piñon-juniper woodland stands. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

Landscape Scale (1,000 to 10,000+ acres)

a Seral state proportions for PJG and JUG are:

Seral Stage	Seral Stage Percent of ERU	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, Forb, Shrub	5	Non-tree: recently burned; grass, forb, and shrub types	N/A	Less than 10% cover
Early-Open	25	Seedling/sapling and open canopy small trees	0-9.9"	10-30% tree cover
Early-Closed	10	Small trees, closed canopy	5-9.9"	Greater than 30% tree cover
Late-Open	50	Medium to large trees, open canopy	Greater than 10"	10-30% tree cover
Late-Closed	10	Medium to large trees, closed canopy	Greater than 10"	Greater than 30% tree cover

b PJG and JUG are generally uneven-aged and open in appearance. Trees occur as individuals, but occasionally in smaller groups, and range from young to old.

c Old growth occurs throughout the landscape, generally in small areas as individual old-growth components, or as clumps of old growth. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts across the landscape over time as a result of succession and disturbance.

d Frequent, low-severity fires (Fire Regime I) are characteristic in this type, with fire return intervals of 8 to 36 years.

e Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and ecosystem function. The understory consists of native grass, forbs, and shrubs; the amount of cover depends on site potential and disturbance.

2 Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity, and to climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Natural and human-caused disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

a At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at finer scales due to a diversity of seral conditions.

b Isolated insect and disease infestations (e.g., *Ips* beetle) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of PJG or JUG.

Mid-scale (10 to 1,000 acres)

3 Snags are scattered across the landscape, averaging 5 snags per acre for snags 8 inches diameter and larger, while snags 18 inches and larger average 1 snag per acre. Coarse woody debris increases in later successional stages and averages 1 to 3 tons per acre.

4 Scattered shrubs and a dense herbaceous understory including native grasses, forbs, and annuals are present to support frequent surface fires.

5 Ground cover consists primarily of perennial grasses and forbs capable of carrying frequent surface fire, with basal vegetation values averaging between 10 and 30 percent, depending on site potential and the TEUI unit. Shrubs average less than 30 percent canopy cover.

Fine-scale (less than 10 acres)

6 PJG and JUG are generally uneven-aged and open in appearance. Trees occur as individuals, but occasionally in smaller groups, and range from young to old.

7 Patch sizes range from individual trees and clumps that are less than 0.1 acre, to tree groups of approximately 1 acre.

8 Occasionally patches of even-aged woodland structure are present, based on disturbance events and regeneration establishment. A smaller percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand-replacement fire, and other disturbances.

Piñon-Juniper Sagebrush

The piñon-juniper sagebrush (PJS) ERU is concentrated in geographic areas dominated by cold (winter) season precipitation regimes and frigid soils. These systems have a distinct appearance of open woodland canopies interspersed by Colorado Plateau and Great Basin shrub species such as big sagebrush (*Artemisia tridentata;* including subspecies: var: *tridentata*, *vaseyana*, and *wyomingensis*), rubber rabbitbrush (*Ericameria nauseosa*), fourwing saltbush (*Atriplex canescens*), and winterfat (*Krascheninnikovia lanata*). Trees occur as individuals or in smaller clumps, and range from young to old. Tree clumps are often even-aged. The understory is dominated by moderate to high-density shrubs, and the development of the herb layer is limited and concentrated in canopy openings. The tree and shrub species composition varies throughout the Forest; piñon is absent at lower elevations, but one or more juniper species are always present. Generally, the sparse native understory grass development includes perennial species, while forbs consist of both annuals and perennials. Shrubs are characteristically well-distributed, and usually achieve high canopy closure during mature successional phases or where livestock grazing has favored their development over herb species.

Desired Conditions Piñon-Juniper Sagebrush **(FW-PJS-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 PJS is a mix of trees and shrubs that occurs as a series of vegetation states that move from herbaceous-dominated to shrub-dominated to tree-dominated over time. Piñon trees are occasionally absent, but one or more juniper species is always present. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

a Seral state proportions for PJS are:

Seral Stage	Seral Stage Percent of ERU	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, Forb, Shrub	10	Non-tree: Recently burned; grass, forb, and shrub types	N/A	Less than 10% cover
Early-Open	25	Seedling/sapling and open canopy small trees	0-9.9”	10-30% tree cover
Early-Closed	20	Small trees, closed canopy	5-9.9”	Greater than 30% tree cover
Late-Open	35	Medium to large trees, open canopy	Greater than 10”	10-30% tree cover
Late-Closed	10	Medium to large trees, closed canopy	Greater than 10”	Greater than 30% tree cover

Landscape Scale (1,000 to 10,000+ acres)

2 The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances (e.g., insects, diseases, and fire) and to climate variability.

- a Isolated insect and disease infestations (e.g., *Ips* beetle) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of PJS.
- b Old growth occurs throughout the landscape, generally in small areas, as individual old-growth components or small clumps. Old-growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance.
- c Overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at the fine- and mid- scales owing to a diversity of seral conditions.

3 Fires are typically infrequent mixed-severity, with rare stand-replacement fires (Fire Regime III (V)).

Mid-scale (10 to 1,000 acres)

4 Snags and old trees with dead tops or limbs are scattered across the landscape, with snags larger than 8 inches DRC averaging 6 snags per acre, and snags 18 inches and larger DRC averaging 1 snag per acre.

5 Coarse woody debris averages about 4 tons per acre.

6 The understory is dominated by moderate to high densities of shrubs (average greater than 30 percent cover), depending on successional stage. The shrub component consists of one or a mix of shrub species (e.g., sagebrush, evergreen shrub, oak, or other), which are well-distributed. Shrubs typically are in a closed canopy state during later successional stages.

7 Ground cover consists primarily of shrubs, perennial grasses, and forbs capable of carrying surface fire only infrequently, with basal vegetation values averaging between about 10 and 35 percent, depending on site potential and the TEUI unit.

Fine-scale (less than 10 acres)

8 Trees occur as individuals or in smaller groups, and range from young to old. Groups are typically even-aged in structure.

9 Patch size of woodlands range from one to tens of acres, and occasionally includes patches of even-aged woodland structure, based on disturbance events and regeneration establishment.

Piñon-Juniper Woodlands

Persistent piñon-juniper woodlands (PJO) are mostly found on lower slopes of mountains and in upland rolling hills at approximately 5,500 to 8,500 feet in elevation. They have broad grouping of different plant associations with trees occurring as individuals or in smaller groups and range from young to old, but more typically as large, multi-aged structured patches. Persistent PJO characteristically has a moderate to dense tree canopy and a sparse understory of perennial grasses, annual and perennial forbs, and shrubs. Woodland development occurs in distinctive phases, ranging from open grass-forb, to mid-aged open canopy, to mature closed canopy. PJO on broken or rocky terrain exhibits little to no natural fire, and insects and disease may be the only disturbance agents. Most common piñon pine is the two-needle piñon occurring in limited areas. One-seed juniper is most common; however, there are areas of Utah juniper and Rocky Mountain juniper. In addition, annual and perennial grasses and graminoids, forbs, half-shrubs and shrubs can be found beneath the woodland overstory. PJO is a climax community and shifts to grasslands following fire events, which are historically infrequent (e.g., up to 400 years). Currently at the plan scale, PJO is included in fire regime condition class (FRCC) 2 (SFNF Assessment 2016).

Desired Conditions for Piñon-Juniper Woodlands **(FW-PJO-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 Persistent piñon-juniper woodlands consist of even-aged patches of piñons and junipers that at the landscape level form multi-aged woodlands. Seral state proportions are applied at the landscape scale, where contributions from all seral stages and low overall departure from reference proportions are positive indicators of ecosystem condition.

a Seral state proportions for PJO are:

Seral Stage	Seral Stage Percent of ERU	Description	Tree size class (diameter in inches)	Vegetation cover and structure
Grass, Forb, Shrub	10	Non-tree: Recently burned; grass, forb, and shrub types	N/A	Less than 10% cover
Early-Open	5	Seedling/sapling and open canopy small trees	0-9.9”	10-30% tree cover
Early-Closed	15	Small trees, closed canopy	5-9.9”	Greater than 30% tree cover
Late-Open	10	Medium to large trees, open canopy	Greater than 10”	10-30% tree cover
Late-Closed	60	Medium to large trees, closed canopy	Greater than 10”	Greater than 30% tree cover

2 Old growth includes old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity, and is often concentrated in mid- and fine-scale units as patches of old growth. The location of old growth shifts on the landscape over time as a result of succession and disturbance. Very old trees (over 300 years old) are present, while snags and older trees with dead limbs and/or tops are scattered across the landscape.

Landscape Scale (1,000 to 10,000+ acres)

a Snags 8 inches DRC or larger, average 5 snags per acre, while snags 18 inches DRC or larger average 1 snag per acre.

b Coarse woody debris increases in later successional stages and averages 2 to 5 tons per acre.

3 At the plan unit scale, overall plant composition similarity to site potential (e.g., FSH 2090.11) averages more than 66 percent, but can vary considerably at fine- and mid- scales owing to a diversity of seral conditions.

4 The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances (e.g., insects, diseases, and fire), as well as climate variability.

a Fire as a disturbance is less frequent and variable due to differences in ground cover. The fires that do occur are mixed to high severity (Fire Regime III, IV, and V) and generally fine scale.

b Isolated insect and disease infestations (e.g., *Ips* beetle) occur at endemic levels (within the natural range of variability, typically frequent small-scale) that do not affect the ecological function or sustainability of piñon-juniper.

Mid-scale (10 to 1,000 acres)

5 Tree density and canopy cover are high, shrubs are sparse to moderate, and herbaceous cover is low. The amount of shrub cover depends on the TEUI unit.

6 Ground cover consists of shrubs, perennial grasses, and forbs, and ranges between 5 and 15 percent, depending on site potential and the TEUI unit.

7 Trees occur in even-aged patches ranging from young to old, where patch sizes range from tens to hundreds of acres.

Sagebrush Shrubland

The sagebrush shrubland (SAGE) vegetation community primarily occurs adjacent to Great Basin grassland and piñon-juniper woodland ERUs. The dominant shrub, big sagebrush (*Artemisia tridentata*), consists of a number of important varieties and wildlife use is associated with specific varieties of big sagebrush due to the chemical variation and forage preference for each variety. Most of the varieties found in the forest include big sagebrush (*A. t.* ssp. *tridentata*), mountain sagebrush (*A. t.* ssp. *vaseyana*), and Wyoming sagebrush (*A. t.* ssp. *wyomingensis*). These sagebrush varieties each create different communities, where big sage occurs in drainages, Wyoming dominates lower elevations, and mountain dominates higher elevations in SAGE communities. All sagebrush types are important, as they provide thermal cover and protection (including nesting cover and escape cover) for various species of wildlife (e.g., upland birds). Sagebrush can also make up a significant forage and protein source for wildlife. Other common species include broom snakeweed, winterfat (*Krascheninnikovia lanata*), and blue grama (*Bouteloua gracilis*). Historically, tree canopy cover exceeded 10 percent, with the exception of early, post-fire plant communities. SAGE sites are usually found on deep well-drained valley bottom soils between 6,200 and 7,800 feet.

Desired Conditions for Sagebrush Shrubland **(FW-SAGE-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 The composition, structure, and function of biotic and abiotic components of the SAGE vegetation community are within the natural range of variability.

a Seral state proportions for SAGE are:

Seral Stage	Seral Stage Percent of ERU	Description	Vegetation cover
Early	15	Recently burned, sparsely vegetated, herb dominance types	Less than 10% tree and shrub cover
Mid/Late-Open	55	Shrub, open canopy	10-30% shrub cover
Late-Closed	30	Shrub, closed canopy	Greater than 30% shrub cover

b Shrub cover ranges from 20 to 85 percent, depending on elevation, soil type, aspect, and site.

i. Wyoming big sagebrush is the dominant species, other shrubs such as broom snakeweed and shadscale are common, as are grassland species such as blue grama, junegrass, and western wheatgrass.

c Groups of trees and single tree cover is less than 10 percent.

d A vigorous, though not necessarily dense, understory community of native grasses and forbs is present with cover at 10 to 20 percent and bare soil as high as 40 percent, depending on site potential and TEUI unit.

e Biological soil crusts are present and improve nutrient cycling and stabilize soils.

2 The SAGE vegetation type is characterized by fairly frequent (12 to 70 years), mixed-severity fire (Fire Regime III).

Alpine and Tundra

The alpine and tundra (ALP) vegetation community is present on only 5,015 acres in the Santa Fe NF at the highest elevations within the northeastern zone from approximately 11,800 to 13,100 feet. Alpine areas are typically barren with sparse vegetation including grasses, forbs, lichens, and low shrubs found in the Gelic soil temperature regime. Unstable substrates, exposure to high winds, and a short growing season make it difficult for plants to establish and grow in these areas. Barren areas include rocky outcroppings, scree slopes, and open fell-fields. Open fell-fields may include the following species: mountain sandwort (*Arenaria capillaries*), black and white sedge (*Carex albonigra*), Payson's sedge (*Carex paysonis*), Ross's avens (*Geum rossii*), Bellardi bog sedge (*Kobresia myosuroides*), twinflower sandwort (*Minuartia obtusiloba*), Asian forget-me-not (*Myosotis asiatica*), nailwort (*Paronychia pulvinata*), wherry (*Phlox pulvinata*), creeping sibbaldia (*Sibbaldia procumbens*), and moss campion (*Silene acaulis*). Within the alpine region, tundra can be found on gradual to moderate slopes, flat ridges, valleys, and basins, where there is fairly stable soil. The tundra system is typically characterized by low-growing, perennial graminoids and forbs, historically with less than 10 percent tree cover. Rhizomatous, sod-forming sedges are the dominant graminoids, and prostrate and mat-forming plants with thick rootstocks or taproots characterize the forbs. Dominant species include sagebrush (*Artemisia arctica*), sedges (*Carex* spp.), tufted hairgrass (*Deschampsia caespitosa*), fescue grasses (*Festuca* spp.), Ross's avens (*Geum rossii*), Bellardi bog sedge (*Kobresia myosuroides*), wherry (*Phlox pulvinata*), and alpine clover (*Trifolium dasyphyllum*).

Desired Conditions for Alpine and Tundra **(FW-ALP-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 The composition, structure, and function of biotic and abiotic components of the ALP vegetation community are within the natural range of variability.

a Seral state proportions for ALP are:

Seral Stage	Seral Stage Percent of ERU	Description	Vegetation cover
Early	5	Recently burned, sparsely vegetated, all herb types	N/A
Mid/Late	95	All shrub and herb types	N/A

2 Tree cover is typically less than 10 percent. Completely barren or rocky areas make up only a small percentage of the vegetation community. The patch distribution of rock and herbaceous cover is finely patterned with about 60 percent total vegetation cover.

3 Alpine ecosystems occupy harsh high-elevation sites, resulting in short stature and relatively slow growth for both shrubs and herbaceous species. Wetland communities are present in snowloaded depressions and are dominated by plane leaf willow, snow willow, and arctic willow. Alpine fell-fields[1] are dominated by alpine clover, alpine avens, Bellardi bog sedge, and a variety of other forbs, graminoids, and dwarf willows. Conservation of this ERU allows for the persistence of alpine-obligate wildlife such as white -tailed ptarmigan

[1] Fell-fields are areas on alpine slopes where cycles of freezing and thawing (frost events) and wind create niche habitats for plants within small interspaces in rocks and scree.

Landscape Scale (1,000 to 10,000+ acres)

4 Key features such as boulder fields and talus slopes, which are necessary to allow for persistence of alpine larkspur, white-tailed ptarmigan, and other alpine-dependent plant and animal species (e.g., marmots, pika, and bighorn sheep), are well distributed and undisturbed, within the capacity of the vegetation community.

5 ALP is resilient to natural and human-caused impacts.

a The ALP ERU is characterized by an historic Fire Regime Group IIIc, with an average fire return interval of 100 to 200 years from mixed-severity fire.

b Endemic levels of disturbances (e.g., insects, diseases, fire, snow, and wind) maintain a functioning ecosystem that contains all its components, processes, and conditions. Plants, animals, and geologic features that contribute to ecological diversity and uniqueness are maintained.

Montane Subalpine Grasslands

The montane subalpine grasslands (MSG) occur at elevations ranging from 8,000 to 11,000 feet as small to large openings within spruce-fir, mixed conifer, and ponderosa pine forests and often harbor several plant associations with varying dominant grasses and herbaceous species. MSG are a mix of grass communities including bunchgrasses, perennial and annual forbs, sod-grasses, and sedges. These meadows typically have higher herbaceous species richness than adjacent forest and are typically dominated by Arizona fescue, mountain muhly, screwleaf muhly, wheatgrasses, oatgrasses, and Thurber's fescue, depending on soil texture, soil moisture, elevation, site exposure (e.g., ridges), and disturbance. Trees and shrubs may occur along the periphery of the meadows. These meadows are seasonally wet, which is closely tied to snowmelt, but do not typically experience flooding events.

Desired Conditions for Montane Subalpine Grasslands **(FW-MSG-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 The composition, structure, and function of biotic and abiotic components of the MSG vegetation community are within the natural range of variability.

a Seral state proportions for MSG are:

Seral Stage	Seral Stage Percent of ERU	Description	Vegetation cover
Early; Low and moderate ecological status	20	Recently burned, sparsely vegetated, all herb types; early development grassland	Less than 10% tree, shrub, and grass cover
Mid- to Late seral. High ecological status.	65	Dominant grasses and forbs	Less than 10% tree and shrub; greater than 10% grass cover
Mid- to Late seral. Low and moderate ecological status.	15	All herb types of low-mod ecological status.	Less than 10% tree, 10-30% shrub; greater than 10% grass cover
Encroached by woody species*	0	Tree or shrub invaded	Greater than 10% tree or shrub cover

*Contemporary landscapes only

b MSG are open and grassy (cover 50 to 90 percent) with tree and shrub canopy cover less than 10 percent.

c Vegetation is dominated by a diversity of desirable native warm and cool season grasses and forbs and are maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling, while providing food and cover for wildlife and livestock.

d Soil function is sustained. Soils are permeable and capable of infiltrating water to reduce overland flows during precipitation events, limiting erosion and deposition.

2 The MSG vegetation type is characterized by frequent (2 to 22 years) high-severity fire (Fire Regime I) where grass is consumed but impacts to soil are low. Fire return intervals are influenced by the fire regimes in adjoining vegetation types.

Mid-scale (10 to 1,000 acres)

3 The composition, structure, and distribution of native vegetation reflect a mix of early, middle, and late seral stages. Early seral stages typically contain more forbs, while older stages are dominated by bunchgrasses. Native plant species are present in all age classes and are healthy, reproducing, and persisting.

4 Depending on soil type, bare soil is no more than 55 percent of an area and is most often less than 10 percent. Vegetative groundcover ranges between 30 to 75 percent.

5 Soil conditions support vegetation communities that provide hiding, nesting, and thermal cover in contiguous blocks for wildlife.

Fine-scale (less than 10 acres)

6 Vegetative biological diversity is high in MSG. Disturbance and site potential result in a mosaic of vegetation densities (densely vegetated to bare areas) across the landscape.

7 Cool season grasses and forbs provide nutritional forage while shrubs and standing grass growth from the previous year provide hiding cover to protect wildlife from predation.

8 Grasslands are connected with minimal (less than 5 percent) shrub and tree cover.

Colorado Plateau and Great Basin Grasslands

The Colorado Plateau and Great Basin Grasslands (CPGB) are found along elevational and temperature gradients above semi-desert grasslands and below montane-subalpine grasslands. It occupies cooler and wetter sites than semi-desert grasslands. This ERU is typically associated with piñon-juniper grass along the grassland-woodland ecotone in cool climates. Vegetation coverage consists of mostly grasses and interspersed shrubs. Grass species may include but are not limited to Indian ricegrass, threeawn, blue grama, needle and thread grass, spike fescue, muhly, James' galleta, and Sandberg bluegrass. Shrub species may include but are not limited to various species of sagebrush, saltbush, Ephedra, snakeweed, winterfat, one-seeded juniper, Utah juniper and wax currant.

Desired Conditions for Colorado Plateau and Great Basin Grasslands **(FW-CPGB-DC)**

Landscape Scale (1,000 to 10,000+ acres)

1 The composition, structure, and function of biotic and abiotic components of the Colorado Plateau and Great Basin Grassland vegetation community are within the natural range of variability.

a Seral state proportions for CPGB are:

Seral Stage	Seral Stage % of ERU	Description	Vegetation cover
Early seral	5	Recently burned; sparsely vegetated	Grasses, shrubs, and trees <10%
Mid to late grassland. *High ecological status.*	70	Dominated by grasses and forbs	Grasses >10 %; shrubs, and trees <10%
Mid to late grassland. *Low - moderate ecological status*	25	Dominated by grasses and forbs	Trees <10%; Shrubs 10- 30%; Grasses >10%
Encroached by woody species.	20	Shrub or tree dominated	Shrub cover 10–30%; Tree cover 10-30%

b Colorado Plateau and Great Basin Grasslands are open and grassy (cover greater than 25 percent) with tree and shrub canopy cover less than 10 percent.

c Vegetation is dominated by a diversity of warm and cool season grasses maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling, while providing food and cover for wildlife and livestock.

d Soil function is sustained. Soils are permeable and capable of infiltrating water to reduce overland flows during precipitation events limiting erosion and deposition.

2 The Colorado Plateau and Great Basin Grassland vegetation type is characterized by frequent (10 to 30 years) high-severity fire (Fire Regime I) where grass is consumed but impacts to soil are low.

Mid-scale (10 to 1,000 acres)

3 The composition, structure, and distribution of native vegetation reflect a mix of early, middle, and late seral stages. Mid-seral stages are dominated by grasses with cover greater than 25 percent grass and less than 10 percent shrub, while late seral stages have 10 to 30 percent shrub cover. Native plant species are present in all age classes and are healthy, reproducing, and persisting.

4 Depending on soil type, bare soil is no more than 50 percent of an area and averages 35 percent. Groundcover vegetation ranges between 10 and 40 percent.

Fine-scale (less than 10 acres)

5 Disturbance and site potential result in a mosaic of vegetation densities (densely vegetated areas to bare areas) across the landscape.

6 Cool season grasses and forbs provide nutritional forage, while shrubs and standing grass growth from the previous year provide hiding cover to protect wildlife from predation.

7 Grasslands are connected with minimal (less than 5 percent) shrub and tree cover.

Wildland-Urban Interface (WUI)

"Wildland urban interfaces are more and more prevalent across our public lands and it is important to develop strategies to protect them. Especially important is working with communities in the wildland urban interface to make them 'Fire Wise,' maintaining defensible space around their homes and keeping our firefighters safe"

(Terrance Gallegos, Deputy Fire Staff for the Santa Fe National Forest).

The wildland-urban interface (WUI) is where homes and wildlands meet or intermingle (Stein et al. 2013); the wildland area surrounding resident populations, and other human developments of special significance that are at imminent risk from wildfire. These areas may include residential homes, critical communications sites, municipal watersheds, high voltage transmission lines, observatories, church or scout camps, research facilities, and other structures that if destroyed by fire, would result in hardship to communities. WUI areas encompass not only the sites themselves, but also the continuous slopes and fuels that lie adjacent to and surround the sites.

The Santa Fe NF is faced with varied and unique challenges, given its proximity to numerous WUI areas. For instance, the forest provides a large percentage of the drinking water for the city of Santa Fe, and other surrounding areas. Thus, the protection of the Santa Fe Municipal watershed from a large uncharacteristic fire such as the Los Conchas or Cerro Grande fires of the past two decades, is a primary concern. Any large, high-severity fire in this area would pose a serious hazard to human health and safety. Many urban WUI areas border the Santa Fe NF and the larger population centers of Santa Fe, Los Alamos, and Las Vegas. The forest also intersects numerous smaller, rural communities with values at risk. Collaborative efforts among the forest; tribes; cities, counties, and community agencies; non-profits; and landowners can help to mitigate the risk of uncharacteristic fire within these complex WUI areas through fuels reduction treatments. High-priority areas for risk mitigation are identified through risk assessments, while public health and safety is addressed through determining evacuation plans and providing education and awareness. These factors combined help the forest move toward the desired conditions for WUI.

WUI areas provide numerous supporting, cultural, and provisioning ecosystem services to the people who live, work, or recreate there. These areas offer a transitional environment between the more hectic life of the city and the gentler pace of nature, increasing human health and well-being. Trees surrounding homes or other structures provide shade, which reduces cooling costs in the summer, and provide wind breaks that buffer homes and structures from direct winds. The complex vegetation arrangements in WUI areas may support a greater diversity of wildlife and avian species, enhancing wildlife viewing or bird watching opportunities. Further, WUI areas provide corridors for utilities that deliver an array of amenities to area residents. The reduction of fire risk within WUI areas not only protects human life, property, and infrastructure, but it can also benefit the surrounding ecosystem, providing regulating ecosystem services. Fuel reduction treatments in the WUI would increase the health and vigor of residual trees, which in turn contributes to increased air quality, benefitting the humans (and animals) that reside in or visit the WUI.

Desired Conditions for Wildland-Urban Interface **(FW-WUI-DC)**

1 Wildland fires in the WUI do not result in the loss of life, property, or characteristic ecosystem function.

2 Wildland fires in the WUI are low to moderate intensity surface fires. Firefighters are able to safely and efficiently suppress wildfires in the WUI using direct attack.

3 Ecosystem structure promotes low-intensity surface fires in areas where the WUI intersects vegetation types with a mixed- or high-severity fire regimes (e.g., SFF and MCW).

   a Tree basal area reflects the low end of the range within the desired conditions for individual vegetation types.

   b Ladder fuels are nearly absent.

   c Openings between tree groups are of sufficient size to discourage isolated group torching from spreading as a crown fire to other groups. Trees within groups may be more widely spaced with less interlocking of the crowns than desirable in adjacent forest lands. Openings with grass/forb/shrub vegetation occupy the mid to upper end of the percentage range in the desired conditions.

4 Dead and down fuel load is between 1 and 10 tons per acre, depending on ERU, with lower amounts in fire-adapted ERUs, and higher amounts in infrequent fire types. These light fuel loads are desirable even in vegetation types with higher reference fuel loads, such as mixed conifer with aspen or spruce-fir, to provide improved fire protection to human developments of special significance. Logs and snags are present in the WUI at the lower end of the range given in the vegetation community desired conditions.

Fire and Fuels

"There is a need for desired conditions for fire adapted vegetation types that recognize the natural role of fire in the landscape."

(Public comment on the Need for Change, fall 2015)

Wildland fire is any non-structure fire that occurs in forests, woodlands, shrublands, or grasslands and includes planned (prescribed fire), unplanned naturally caused fires (i.e., lightning ignitions), or unwanted human-caused fires (e.g., escaped campfires). Most of the vegetation on the Santa Fe NF is adapted to recurrent wildland fires that may be as frequent as every 2 years in montane subalpine grassland or as infrequent as every 500 years in mixed conifer with aspen. However, most fire-adapted systems in the forest are highly departed from their natural fire regimes. Decades of active fire suppression efforts have dramatically changed the vegetative composition on the Santa Fe NF from reference conditions. Many areas of the forest are now characterized by abnormally high stand densities and shifted species compositions, where fire-sensitive species like white fir have colonized stands, displacing many fire-adapted species (e.g., ponderosa pine and Douglas-fir).

Frequent, low-severity fires have played a vital role in maintaining the health of many fire-adapted ecosystems throughout history. These fires consume fine fuels (e.g., litter, woody debris) and maintain open stand conditions by suppressing over-abundant small-diameter seedlings and saplings. The reduction in fine fuels and small trees, which function as ladder fuels, greatly reduces the risk of uncharacteristic fire. Frequent, low-severity fires generally do not damage larger diameter trees, especially for species such as ponderosa pine and Douglas-fir that have thick bark designed to withstand low- to moderate-severity fire. Because these larger trees are resistant, low-severity fires can help reduce competition for resources, decrease drought stress, promote old-growth development, increase forest health, and potentially increase timber values. Furthermore, the combination of canopy openings (created through fire) and the burning of organic materials, promote the growth of grasses and forbs, which provide forage for wildlife and grazing animals, stabilize soil, support proper water infiltration, and increase plant diversity.

Other areas within the Santa Fe NF, such as high-elevation spruce-fir forests, have historically supported infrequent fire regimes characterized by moderate- to high-severity fire. These fires create patches of vegetation with varied ages and structures, increase snag density, and (in some areas) regenerate aspen. Sometimes, these typical fire events lead to subsequent beetle outbreaks, which further open canopies and increase the proportion of early seral states on the landscape. Although fire may be a rare occurrence in infrequent fire ecosystems, fire and other disturbances are ecologically significant and are necessary to initiate early seral states within larger, mature stands. Patches of early seral states (e.g., shrub-forb-grass, or aspen) contribute to habitat diversity important for certain wildlife and avian species and increase the resiliency of the larger ecosystem to widespread disturbance agents such as insect outbreaks or disease, which tend to infect dense stands of older, stressed trees.

Healthy Ecosystems are resilient to uncharacteristic fire disturbance (fires that burn large areas with excessive severity). Fire, both planned and unplanned, is a tool for restoring fire-adapted ecosystems that burn under natural fire regimes, where fires typically burn over smaller areas and with mixed (not extreme) severity. However, in areas where vegetation structure is not consistent with desired conditions, specifically areas with closed canopies and abundant ladder fuels, fuel reduction treatments are needed to minimize risks of uncharacteristic fire. When appropriate weather and fuel conditions exist, the use of wildland fire is a cost-effective tool for restoring ecosystem function and reducing the likelihood of wildland fire uncharacteristic to its natural

regime. In addition to fire treatments, management activities, such as thinning or tree harvesting, may be needed to reduce tree density and canopy cover, and support the return of natural fire regimes. Following thinning treatments, (prescribed) fire may be needed to remove residual fuels and further reduce the risk of uncharacteristic fire.

Natural and planned fires provide numerous ecosystem services benefitting the environment and people. Fires increase biodiversity by creating a mosaic of stand conditions and landscape types beneficial to wildlife (e.g., snags, coarse woody debris, or forage). Fires provide support and regulating ecosystem services by contributing to proper nutrient cycling, increased tree health, reduced competition and water stress, increased resistance and resilience from subsequent disturbances (e.g., insect outbreaks, disease, or drought), and restored species compositions (e.g., removal of white fir or other fire sensitive species in frequent-fire ecosystems). Support or provisioning benefits to humans from the restoration of more natural fire regimes may include, increased grass growth (e.g., forage), which could support livestock grazing, benefitting local ranchers; increased health and vigor of residual trees leading to more valuable timber or the development of old-growth forest characteristics; beautiful aspen vistas; open forest conditions that ease access for collecting forest products; and the protection of property and other valuable resources from future fires.

Desired Conditions for Fire and Fuels **(FW-FIRE-DC)**

1 Wildland fires do not result in the loss of life, property, or cultural resources, or create irreparable harm to ecological resources.

2 Wildland fire protects, maintains, and enhances resources. It is allowed to function in its natural ecological role on a landscape scale and across administrative boundaries, under conditions where safety and values at risk can be protected.

3 Wildland fires burn within the range of severity and frequency of historic fire regimes for the affected vegetation communities. High-severity fires rarely occur where they were not historically part of the fire regime.

4 Naturally caused fires predominate; accidental human-caused fires (e.g., abandoned campfire, downed powerlines) are rare.

5 Fires function in their natural ecological role in designated areas (e.g., wilderness and research natural areas).

6 Restoration and fuel treatments result in ecological resources that are adaptable to changing climate conditions.

Standards for Fire and Fuels **(FW-FIRE-S)**

1 Human safety must be the highest priority in all fire response actions.

2 A suppression strategy must occur on human-caused fire or where necessary to protect life, investments, and valuable resources (e.g., wildland-urban interface) at the lowest cost with the fewest negative consequences with respect to firefighter and public safety.

3 When suppression is an objective, the agency administrator must consider firefighter exposure, risk, values, cost, and likelihood of success, before trying to limit the size of wildfires.

Guidelines for Fire and Fuels **(FW-FIRE-G)**

1. Naturally occurring fires should be allowed to perform their natural ecological role to meet multiple resource objectives and facilitate progress toward desired conditions (per desired conditions of various resources throughout the plan).
2. Wildfire (naturally ignited fire) should only be suppressed when outside the natural range of variability or where necessary to protect life, investments, and valuable resources.
3. Response to unplanned ignitions that cross jurisdictional boundaries should be coordinated and managed to meet the responsible agency's objectives.
4. Fire management activities should be coordinated with specialists of resources that may be impacted.
5. Wildfire response should be spatially and temporally dynamic, and should be based on a risk management approach that accomplishes integrated resource objectives.
6. Measures should be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease (e.g., chytrid fungus, Didiymo, and whirling disease), when drafting (withdrawing) water from streams or other waterbodies during fire management activities (Preventing Spread of Aquatic Invasive Organisms Common to the Southwestern Region Technical Guidelines for Fire Operations, Interagency Guidance Rev. August 2009).
7. Measures should be taken to prevent the spread of invasive plant species by equipment and personnel during fire management and rehabilitation operations.
8. Post-fire restoration and recovery should be provided where critical resource concerns merit rehabilitation for controlling the spread of invasive species, protecting areas of cultural concern, protecting critical or endangered species habitat, or protecting other highly valued resources such as drinking water.
9. Higher fire intensities and associated fire effects at the fine scale (less than 10 acres) should be accepted in areas that are moderately to highly departed from desired conditions. Multiple small areas of high mortality are preferable to a single large, high-severity area.
10. Burn pile composition should contain a mixture of fuel sizes. Large woody fuels, 9 inches in diameter or greater, should be limited to less than 40 percent of the composition of the pile to prevent adverse impacts to the soil.
11. Depth of masticated materials should not exceed an average of 4 inches and materials should be discontinuous at the quarter-acre scale to protect the soil and allow for natural revegetation.

Management Approaches for Fire and Fuels **(FW-FIRE-MA)**

1. Consider collaborating with stakeholders and partnering agencies early and often to successfully meet resource objectives through the use of fire while minimizing adverse impacts. Educate internally and externally the potential benefits, challenges and tradeoffs of wildland fire.
2. Coordinate management of wildland fire across jurisdictional boundaries whenever there is potential for managing a wildfire or a prescribed fire on more than one jurisdiction (e.g., Federal, State, county, local, tribal governments, and land grants, etc.). This includes water sources, access, and land use agreements. This is done with the understanding that fire-adapted ecosystems and communities transcend jurisdictional boundaries. These are all

foundational concepts of the collaboratively developed National Cohesive Wildland Fire Management Strategy.

3. When planning and implementing fuels projects and all hazard response, work collaboratively with Federal, State, local governments, and private landowners; consider promoting public safety and reducing the risk of wildfire on lands of other ownership by supporting the development and implementation of community wildfire protection plans (CWPPs) or similar assessments and management plans to mitigate negative impacts of wildfire. CWPPs are also important tools for mitigation efforts such as wildfire preparedness, evacuation planning, and other mitigations that will aid in wildfire response.
4. When conditions facilitate safe progress toward desired conditions, consider managing naturally ignited fires to meet multiple resource objectives concurrently (i.e., protection and resource enhancement), which can change as the fire spreads across the landscape.
5. Wildfire objectives are based on interdisciplinary assessment of site-specific values such as desired conditions, existing fuel conditions, current and expected weather, fire location, resource availability, social and economic considerations, and values to enhance or protect; and consider courses of action to protect or enhance those values.
6. Consider the use of planned and unplanned fire in areas such as steep and rugged terrain or remote areas, as this may be the only viable tool where mechanical treatments are not feasible.
7. Consider implementing treatments where they provide the most benefit (e.g., values-at-risk) and improve or maintain ecological integrity (e.g., vegetative departure).
8. When managing planned ignitions, consider creating conditions that enable future unplanned ignitions to mimic their historical role or to serve as a tool to achieve resource objectives and to move ecosystems closer to desired conditions.
9. In areas departed or trending away from desired conditions, consider combining the use of fire with mechanical treatments, as this is often the most effective approach to restoring forest structure and function.
10. In areas highly vulnerable to climate change, consider increasing resiliency by using a diversity of treatments to facilitate natural adaptation to changing conditions such as, managing in favor of early- to mid-seral species over late-seral species in ecotones, as species characteristic of lower life zones are adapted for warmer and drier conditions. Consider managing tree basal area at the low end of the range of desired conditions to mitigate water stress.
11. Consider the importance of developing practices and protocols to reduce non-prescribed human ignitions by providing timely and disseminating widely fire danger and fire restriction information. Consider educating the public on their responsibility to help reduce human-caused wildfires by providing information in the form of signage, public contacts, and fire restrictions in locations such as trailheads and designated recreation areas.
12. Consider the scenic effects from prescribed fire during project planning and implementation. Blackened and scorched vegetation may be visible in project areas in the short term following treatments, but take into consideration the long-term scenic integrity objectives.
13. In wildland and managed fire areas that are not expected to reseed naturally, consider seeding with native vegetation and implement other site rehabilitation practices, as necessary. Consider that fire suppression support activities and facilities (including constructed fire lines, fuel breaks and safety areas, fire camps, staging areas, heli-bases, and heli-spots), follow the same site rehabilitation practices.

14. Consider collaborating with scientists (e.g., from universities, Forest Service Research and Development, U.S. Geological Survey, or Ecological Restoration Institute) and other land management agencies or organizations to conduct research on areas impacted by uncharacteristic wildfire to understand how fire has altered the ecological conditions outside the natural range of variation and develop strategies to better manage these areas.
15. Consider using the Wildfire Strategic Response Zones to facilitate informed and transparent decision making that will allow beneficial fires to burn under the right conditions, and inform aggressive strategies when fires need to be suppressed. Five strategic zones were developed for the Santa Fe NF: (1) maintain, (2) restore, (3) protect, (4) exclusion, and (5) high complexity. These zones are dynamic over time and space, and will change as conditions change, affecting management opportunities. For example, an area currently identified as 'Restore' zone could become a 'Maintain' zone after treatment (mechanical or fire). Conversely, a 'Restore' zone could become a 'Protect' zone if changing fuel conditions change expected fire behavior and effect such that fire would not meet forest plan desired conditions.
16. Consider providing educational resources and outreach so that residents living within and adjacent to the forest are knowledgeable about wildfire protection of their homes and property, including providing for defensible space.
17. Managers should consider using a decision support process to guide and document wildfire management decisions. The process will provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions.
18. Wildland fire is understood, both internally and by the public, as a necessary disturbance process integral to the function and sustainability of ecosystems.

Water Resources

"Headwaters and watersheds are critical for urban and agricultural communities."

(Public comments during the Assessment, spring 2014)

"Water is incredibly important ecologically in the arid Southwest."

(Public comment for Wilderness evaluation, fall 2016)

Water resources of the Santa Fe NF include thousands of miles of streams, hundreds of miles of groundwater-dependent ecosystems, and hundreds of acres of non-flowing waterbodies (National Hydrography Geospatial Dataset). Stream ecosystems have flowing water and include creeks and rivers, along with their associated riparian vegetation zones and flood plains. Stream types differ in the timing and duration of surface flow and corresponding vegetation. Ephemeral streams (arroyos) flow for short duration in response to storm events. Intermittent streams flow seasonally, usually in response to snowmelt, and may contain perennially wet areas. Groundwater and groundwater-dependent ecosystems include springs, seeps, wetlands, fens, riparian areas, groundwater-fed streams and lakes, and aquifers. These are present throughout the forest and vary in size and timing of flow and connections to surface waters. Waterbodies serves as a catchall term for lentic systems, which are non-flowing water features. Waterbodies include lakes, ponds, playas, and reservoirs, which when combined would cover nearly 1,000 acres in the forest.

Each of these diverse water features forms an integral part of watersheds. By a strict hydrologic definition, watersheds define an area of the landscape where all the flowing water drains to common point. However, watersheds represent more than a topographically delineated area, they encompass all ecosystem elements in that area from ridgetop to ridgetop—water, geology, soils, biota, and the humans that live, work, and recreate within them. Watersheds scale across the landscape from larger river drainage basins like the Rio Grande with a watershed area over 330,000 square miles spanning across international borders to numerous smaller watersheds spanning less than 1,000 acres nested within the larger watersheds. The United States Geological Survey (USGS) uses a hierarchal scale of 6 levels to delineate the watersheds across the country with Level 1 being the largest (Rio Grande is a Level 1 Hydrologic Unit) to a 6th level being the smallest delineated scale. We organize the Santa Fe NF management plan for water resources at the subwatershed scale. Subwatersheds are generally between 30,000 and 50,000 acres and classified by the USGS as 6th-level hydrologic units and annotated by a 12-digit code, so these subwatersheds are commonly referred to as HUC 12 subwatersheds. The Santa Fe NF intersects 138 HUC 12 subwatersheds (6th-level hydrologic units), collectively, these waters replenish major river systems in New Mexico including the Rio Grande, Santa Cruz, Rio Chama, Pecos River, and the Jemez River.

Because of human demand for water resources and other human land uses, watersheds, and aquatic ecosystems have been altered from their reference condition. While the location of stream channels is generally unchanged, diversion into acequias has changed the hydrologic, riparian, and agroecosystem function of stream systems. Demand for the waters of the Santa Fe NF will continue to increase in the coming decades, challenging the forest to protect existing high-quality water resources and restore degraded areas. Metrics of impairment used to evaluate current condition and trends of water resources vary, but in general, we assess impacts to water resources in three categories: water quality, water yield, and watershed condition.

Water Quality: Surface water quality reflects the surrounding natural physical, biological, and chemical variables, such as elements present in soils and rock substrates, and concentrations of biological and chemical contaminants that originate either from a point (single) source (a discharge pipe) or from runoff that carries contaminants that accumulate over a landscape (nonpoint sources; for example, storm water). Based on New Mexico State Water Quality Standards, the forest's water quality tends to be predominantly good. New Mexico state through the New Mexico Environment Department (NMED) designates uses for waterbodies and establishes quantifiable standards to ensure that water quality supports these established uses (categories include supporting aquatic life, municipal use, recreation, etc.). NMED lists approximately 24 percent of the forest's streams as impaired (NMED 2016). The most common source of water quality impairment is high water temperature as a result of reduced shading or reduced stream flows from drought or water diversion. High turbidity and sedimentation are also common sources of impairment in the forest. Additional water quality protection has been applied to some waters on the Santa Fe NF by the State through designation as Outstanding National Resource Waters (ONRW). ONRW designations include all named waters in wilderness areas. ONRWs receive the highest level of protection under the New Mexico's Water Quality Standards.

Water Yield: Natural and human disturbances have altered and will continue to alter the quantity and timing for the streamflow in the Santa Fe NF. General trends for the region show an increase of drought and drier winters coupled with a trend toward warmer winter temperatures. The earlier runoff season, combined with drought means less water will be available during the late summer and fall. Decreased stream flow will have cascading impacts for both the natural systems and humans that rely on the forest's water. Functioning watersheds show increased resilience to drought and changing precipitation regimes and may replenish streamflow.

Watershed Condition: As watersheds integrate all ecosystem components, assessing watershed condition requires evaluating a suite of metrics. The Santa Fe NF follows the Forest Service's Watershed Condition Framework (WCF) to assess watershed condition and identify priority watersheds. The WCF classifies watersheds using a comprehensive set of 12 watershed condition indicators (FSM 2521.1) chosen to represent ecological, hydrological, and geomorphic functions and processes affecting watershed condition. These features help identify priority watersheds based on (1) broad-scale restoration strategies; (2) the importance of water and watersheds; (3) the urgency and ability of management action to address threats; (4) alignment with other objectives and priorities of the Forest Service and other agencies and organizations; (5) ecological values; and (6) impaired ecosystems including those where improvement or restoration are necessary to meet regulatory requirements. Condition assessments include three categories: Properly Functioning, Functioning at Risk, and Impaired. Projects within priority watersheds are designed, implemented, and monitored for restoration and maintenance of watershed conditions. At least every five years, a re-evaluation will take place to be consistent with the forest plan objectives and the current watershed conditions. Current watersheds and conditions can be found at the WCF map viewer website at: https://apps.fs.usda.gov/wcatt/.

Water from the Santa Fe NF supports many uses throughout New Mexico and locations farther downstream, and provides numerous ecosystem services to the people and animals that inhabit and use these lands. Areas with water are centers of high biological diversity in arid landscapes, and their ecological health is essential for forest ecosystem sustainability. Collectively, surface waters contribute to connectivity for fish and wildlife across the landscape, local and urban potable water supplies, agricultural uses such as acequias, livestock watering and irrigation (which all support local economies), and recreation providing support services, provisions, and cultural benefits.

Acequias provide cultural and provisioning ecosystem services. They feed water to communal agricultural lands, bring families and traditional communities together through the shared work of maintaining them, and contribute to a way of life that spans generations. Water in arid northern New Mexico has important traditional, cultural, and socio-economic significance, which will only become more vital in the future with additional pressures from predicted climate change and continually increasing demands from growing urban populations. Plan and management direction for water resources is integrated throughout many of the different resource areas.

Desired Conditions for Water Resources **(FW-WATER-DC)**

1 Watersheds are functioning properly according to metrics described by the Watershed Condition Framework, other current protocols, and Properly Function Condition (PFC) protocols. Functioning watersheds have the following characteristics:

   a Provide for high biotic integrity (habitats that support self-sustaining assemblages of native plant and animal communities);
   b Are resilient to natural and human-caused disturbances such as fire and climate fluctuations with the ability to recover to reference conditions within the natural range of variability (from Santa Fe National Forest Assessment, USDA-Forest Service 2013a) following disturbance;
   c Exhibit a high degree of connectivity where instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations. In addition, streamflows provide connectivity among fish populations and provide unobstructed routes critical for fulfilling needs of aquatic, riparian-dependent, and many upland species of plants and animals. (Also see DC #3 and #4 in this section.);
   d Maintain long-term soil productivity; and
   e Provide a wide range of sustainable ecosystem services including clean water (DC#3), water quantity to maintain PFC, and other supporting and regulatory services described in DC #2 and #4)

2 Most watersheds support multiple uses (e.g., timber, recreation, traditional and cultural uses, and grazing) with no long-term decline in ecological conditions, although some watersheds are reserved to preserve ecological function and may support more limited uses (e.g., municipal watersheds).

3 Water quality across the forest meets or exceeds the State's water quality standards and provides for the attainment of designated uses.

4 Streams and riparian management zones are connected laterally and longitudinally and capable of filtering, transporting, and storing sediment and wood; aiding floodplain development; improving floodwater retention; withstanding high-flow events; and increasing groundwater recharge.

5 The flow regime (magnitude, timing, duration, frequency, and rate of change) of streams is sustained at levels that maintain or enhance essential ecological functions; including channel and floodplain morphology, groundwater recharge, water quality, nutrient cycling, and stream temperature regulation.

6 Channel type (width/depth ratio, sinuosity, gradient, etc.) is appropriate for the landscape setting (e.g., landform, geology, and bioclimatic region). Stream channels are vertically and laterally stable.

Objectives for Water Resources **(FW-WATER-O)**

1 Maintain "properly functioning" and improve at least two “impaired” or “functioning at-risk” watersheds (Watershed Classification Framework) every 10 years using the objectives from Vegetation ERUs, Aquatic Species, Water Resources, and Riparian Management Zones and Wetland Ecosystems.

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

Standards for Water Resources **(FW-WATER-S)**

1 Best management practices (BMPs, e.g., National Core Technical Guide for BMPs (FS-990A), FSH 2509.22 - Soil and Water Conservation Practices Handbook) must be used to minimize management impacts to maintain water quality.

2 Projects that withdraw water from surface water features or groundwater must ensure that water is maintained at levels that will protect management uses and forest resources, including aquatic species, their habitats, and water quality.

Guidelines for Water Resources **(FW-WATER-G)**

1 New and reauthorized (e.g., permits and environmental analyses including Sec. 18 reviews) management activities should not negatively impact groundwater quality or quantity to the extent that groundwater-dependent ecosystems are adversely affected.

2 Stream channels should not be altered by new management actions unless necessary for resource protection or ecological restoration purposes.

3 To maintain bank stability on perennial and intermittent streams, new or redesigned stream crossings (e.g., bridges and culverts) should be wide enough to successfully pass water, sediment, wood, and aquatic organisms.

4 Measures should be taken to eliminate the risk of introducing new or spreading existing invasive species and pathogens to streams, riparian areas, or wetland ecosystem (per Standard 1 in Wildlife: Nonnative and Invasive Species).

5 Where known, groundwater-dependent ecosystem recharge areas (including those for thermal springs), should be protected or restored to maintain water quality and quantity (discharge).

Management Approaches for Water Resources **(FW-WATER-MA)**

1. Work with local, State, and Tribal governments, land grants, non-governmental organizations, and other stakeholders to identify improvement projects, priorities for protection and management of watersheds especially in priority watersheds (Watershed Condition Class Framework), and high-quality areas (e.g., designated and eligible Wild and Scenic Rivers, Outstanding National Resource Waters, and Wetland Jewels).
2. Work closely with New Mexico Environment Department on water quality management in the forest (e.g., maintaining Memorandum of Understanding, development of Total Maximum Daily Load (TMDL) determinations, developing watershed-based plans, designing and implementing 319 grants).
3. Work with acequia associations and permittees to maintain diversion structures and ditches in properly functioning condition and to remedy impacts (e.g., downcut channels, enlarged channels, loss of riparian habitat) that are caused by water diversions.
4. Consider opportunities to secure instream flows (water rights) for the purposes of improving or sustaining aquatic and riparian ecosystems.
5. Consider developing watershed-specific plans that prioritize specific roads for decommissioning to result in improved water quality and a smaller road system (administrative or public).

Riparian and Wetland Ecosystems

"Riparian areas are the life blood of New Mexico's plant and wildlife diversity."

(Public comment on need for change, Fall 2015)

Riparian ecosystems (RE) include those portions of watersheds around lakes, perennial and intermittent streams, and open water wetlands that have characteristic riparian vegetation and provide riparian function. The riparian ecosystem encompasses any surface water and its associated aquatic habitat, connected shallow groundwater, aquatic and riparian vegetation, associated soils (i.e., hydric and alluvial), and contributing fluvial landforms. While most riparian management zones (RMZ) include riparian obligate or riparian facultative vegetation[4], not all do. Riparian areas only occupy about 2.75 percent of the Santa Fe NF, but provide some of the most important and biodiverse habitats in the forest and are critical for providing supporting and provisioning ecosystem services for the forest and downstream communities.

Wetland ecosystems (WE) are a category of riparian ecosystems; they include open water wetlands, slope wetlands, marshes, wet meadows, cienegas, bogs, and fens. WE are extensive and inclusive, occurring at nearly all elevations in the Santa Fe NF. It supports a wide diversity of riparian and wetland herbaceous species that can vary widely with elevation, water availability, as well as biophysical characteristics (i.e., gradient, salinity), but sedges and rushes are particularly important to system function. It is most common in wide, low-gradient meadows, where the water table is seasonally high, soils are saturated, and trees or shrubs are mostly absent. The prevalent vegetation and aquatic life require saturated or seasonally saturated soil conditions (i.e., hydric soil) to grow and reproduce.

Wetland types differ in water permanency, wetland vegetation, and size. WE associated with streams, springs, and waterbodies are part of the riparian management zone for those features and are often intermixed with other riparian vegetation. Slope wetlands, seeps, springs, and wet meadows often occur in a mosaic with grassland vegetation communities. Ephemeral wetlands contain standing water for a portion of the year (typically from snowmelt in years when precipitation is normal to above normal) and are dry for a portion of the year. They provide important resting habitat during spring migration. Cienegas are linear streams associated with spring recharge that are primarily herbaceous and do not have woody vegetation. Bogs and fens are dominated by peat-forming grasses and mosses, and act as carbon sinks because biomass production exceeds decomposition.

Riparian vegetation characteristics are a critical component in maintaining the unique qualities of riparian ecosystems. The Santa Fe NF includes multiple ERUs classified as riparian vegetation ERUs that may be arranged into three broad groups—the herbaceous group (HERB), the cottonwood group (CWG), and the montane-conifer willow group (MCWG). The HERB group is the most widely distributed group of riparian vegetation in the forest. The CWG and MCWG are also referred to as forest and shrub riparian vegetation communities (FSR). The CWG includes the narrowleaf cottonwood-shrub and Rio Grande cottonwood-shrub ERUs. The MCWG includes the willow-thinleaf alder, ponderosa pine-willow, and the upper montane conifer-willow ERUs.

[4] Obligate riparian species are found almost exclusively in riparian areas. Facultative species are commonly found in the upland and riparian areas.

HERB ERUs are most common in wide, low-gradient meadows, where the water table is seasonally high with saturated soils, and trees or shrubs are mostly absent. HERB ERUs occur at all elevation ranges. FSR vegetation communities occur most frequently in wet drainages that range from narrow, steep and confined to low-gradient streams with wider floodplains and associated flood terraces. The overstory may be shrubby in the case of willow-thinleaf alder sites, or tree-dominated with a variety of species, depending on elevation and site conditions, including spruce, narrowleaf cottonwood, and Rio Grande cottonwood. Willow species are common in the understory. Drought and flooding are the primary natural disturbances. Fire is an infrequent disturbance, but may enter from adjacent vegetation types during dry periods, and effects are generally less severe than in the surrounding uplands.

FSR vegetation communities provide important habitat, including breeding and migration, for many riparian wildlife and bird species (e.g., masked shrew, water shrew, beaver, southwestern willow flycatcher, Wilson's warbler, and yellow-billed cuckoo). Riparian areas have historic and contemporary significance to tribes and traditional communities, due to the cultural value of water and because they contain traditionally used resources that are rare on the landscape (cultural ecosystem services). Restoration on headwater wetlands and first order streams has benefits that cascade throughout the watershed and can facilitate future restoration downstream. Fixing watershed problems at their source assists natural recovery and increases the potential for future restoration lower in the watershed. The forest plan's desired conditions, objectives, and guidelines for the vegetation characteristics of FSRs focus on restoring and maintaining vegetation structure and composition to ensure that these areas continue providing ecosystem services.

Healthy riparian and wetland ecosystems provide important ecosystem services that regulate ecological processes and cycles, provide provisions for human or animal benefit, and offer support for ecological processes. Healthy riparian areas and wetland ecosystems regulate and support water cycling and infiltration rates through slow water movement that raises the water table and saturation zone and recharges aquifers. They also dissipate stream energy, which can reduce flood damage. Riparian zones also protect streams from excessive sedimentation, erosion, and pollution, and, thus, play a role in water quality. Further, they provide shelter and food for aquatic animals and shade that is important for water temperature regulation. Riparian areas and wetland ecosystems provide wildlife habitat, increased biodiversity, and wildlife connectivity, enabling aquatic and riparian organisms to move along river systems, and thus, preventing community isolation and fragmentation. They are also a source of large woody debris recruitment. Soils in riparian ecosystems play a key role in nutrient and water storage and distribution.

Maintaining riparian ecosystem (RE) services and functions requires managing the areas to protect and restore key ecosystem characteristics including vegetation composition, ground cover characteristics, disturbance regimes, and hydrologic function.

Desired Conditions for Riparian and Wetland Ecosystems **(FW-RWE-DC)**

1 Riparian ecosystems have a diverse composition of desirable native plants that contain a mosaic of communities, creating a structurally robust vegetative network that protects the soils from unnatural erosion. Departure from site potential is low (less than 33 percent) (Wahlberg et al. 2013).

a Woody vegetation within forested and shrubland riparian areas and wetland ecosystems display a variety of size classes; they provide terrestrial and aquatic habitats, stream shading (temperature regulation), woody channel debris, aesthetic values, and other ecosystem functions.

b Invasive plant species are absent (per Desired Condition 1 in Wildlife: Nonnative and Invasive Species).

c Riparian communities are free from encroachment by upland species and the extent of riparian communities is expanding or has achieved potential extent.

d The composition, structure, and function of biotic and abiotic components of the HERB riparian vegetation community are within the natural range of variability.

i. Seral state proportions for HERB riparian are:

Seral Stage	Seral Stage Percent of ERU	Description
Early-Open	20	Recently burned, sparsely vegetated, early development grassland
Mid-Open	80	Native obligate wetland species are the predominant species as measured by percent cover for herbaceous bank cover.
Late	0	Tree or shrub invaded
Novel	0	Upland dominance types and non-native invasive vegetation

e The composition, structure, and function of biotic and abiotic components of the FSR vegetation communities are within the natural range of variability.

i. Desired seral stage proportions for FSR-CWG at landscape scale:

Seral Stage	Seral Stage Percent of ERU	Description
Early-Open	25	Herbaceous, open shrub cover, or seedling/sapling tree ≥ 16 feet tall (all cover classes)
Mid-Open	50	Shrub cover ≥ 25%, or small, medium, or large trees, open canopy, ≥ 16 feet tall
Late-Closed	25	Small, medium, or large trees, closed canopy, ≥ 16 feet tall
Novel	0	Upland dominance types and non-native invasive vegetation

ii. Desired seral stage proportions for FSR- MCWG at landscape scale:

Seral Stage	Seral Stage Percent of ERU	Description
Early-Open	65	Herbaceous, open shrub cover, or seedling/sapling tree ≥ 16 feet tall (all cover classes)
Mid-Open	35	Shrub cover ≥ 25%, or small, medium, or large trees, open canopy, ≥ 16 feet tall
Novel	0	Upland dominance types and non-native invasive vegetation

iii. Woody riparian species are reproducing and are structurally diverse with all age classes present. Diverse vegetation structure, including mature trees, snags, logs, and coarse woody debris, is present to provide habitat for riparian-dependent species.

iv. Dense willow conditions (70 percent cover or greater) are retained as high value wildlife habitat.

v. Upland, dry-site vegetation is not encroaching, and the extent of riparian communities is widening or has achieved its potential and is within the natural range of variability.

2. Riparian and wetland ecosystems have highly productive soils that maintain vegetative cover sufficient to catch sediment, dissipate energy, prevent erosion, stabilize stream banks and shorelines, provide aquatic and terrestrial wildlife habitat, and promote floodplain development. Low departure (0 to 33 percent similarity, LANDFIRE departure formula) from site potential expressed for basal vegetation or bare ground for given TEUI units (Miller et al. 1993), area-weighted for all TEUI units within an analysis area.

   a Long-term impacts to soils (e.g., soil erosion, soil compaction, soil displacement, puddling, and severely burned soils) are rare or non-existent on all riparian area and wetland ecosystems.

   b Moist soil conditions (e.g., thick litter layers, wet areas, coarse woody debris, and decaying debris) are maintained and well-distributed, within the capacity of the vegetation community for at-risk species.

   c Riparian areas should retain a value of more than 30 pieces coarse woody debris per mile (more than 18 per kilometer), diameter larger than 12 inches (larger than 30 centimeters), length over 35 feet (over 10 meters) based on what is considered proper functioning condition.

   d Coarse woody debris provides habitat and is being adequately recruited, to provide a reliable source of replacement.

   e Riparian forest vegetation provides basic life-cycle needs (e.g., nesting, foraging) for riparian-dependent wildlife species (e.g., Neotropical migrant birds, at-risk species).

   f Nectar sources (e.g., buttercup, monkey flower, mountain bluebell, and field mint) are available for at-risk species.

3 Riparian areas have a low departure from historic fire regime (0 to 33 percent similarity, LANDFIRE departure formula)

   a Compared to surrounding uplands, perennial riparian corridors have characteristics (e.g., surface water and saturated soils) that reduce the frequency and severity of fire. Fire is limited or absent and mixed- to high-severity fire occurs very infrequently.

4 Riparian areas and wetland ecosystems meet the standards defined by proper functioning condition metrics (e.g., USDI 2015 and USDI 2020). RE and WE are supported by surface and subsurface flow regimes that contribute to stream-channel and floodplain development, maintenance, and function; which maintain soil moisture necessary for riparian connectivity and for the regeneration of native plants that depend on flooding or high water tables.

   a Stream channels, riparian areas, and wetland ecosystems are resilient to ecological disturbances (e.g., floods, fire, drought, and changes in climate) and human activities (e.g., roads, livestock, and recreation).
   b RE and WE are widening or have achieved potential extent and are within their natural range of variability.
   c Overall wetland condition score of 'A' or 'B' or equivalent rating for proper functioning condition (sensu USDI 2015 and USDI 2020)

Objective for Riparian and Wetland Ecosystems **(FW-RWE-O)**

1 Riparian ecosystems move toward desired conditions (less than a 33 percent departure from DC) for vegetation functional diversity, vegetation seral state, riparian corridor connectivity, and flood regime (frequency, duration, and magnitude) by implementing 15 miles of stream restoration every 10 years.[5]

Standard for Riparian and Wetland Ecosystems **(FW-RWE-S)**

1 Ground-disturbing activities within riparian areas and wetland ecosystems must take measures to avoid introducing new or spreading existing invasive species and pathogens (per Standard 1 in Wildlife: Nonnative Invasive Species).

[5]Actions that could improve riparian areas would be site-specific, but could include several of the following: removing invasive plant species, stream channel stabilization, restoring hydrologic connectivity between stream channel and riparian area, planting native species, promoting natural revegetation of bare ground, and redirecting other uses (e.g., providing other watering sources, closing areas to camping).

Guidelines for Riparian and Wetland Ecosystems **(FW-RWE-G)**

1 Riparian management zones (RMZ) should be defined to include either a site-appropriate delineation of the riparian area or a buffer of 100 feet from the edges (e.g., each stream bank at bankfull or edge of the water body) of all perennial and intermittent streams, lakes, seeps, springs, and other wetlands or 15 feet from the edges of the ephemeral channels. The waterbody itself is considered part of the RMZ. The exact width of RMZs may vary based on ecological or geomorphic factors or by waterbody type, but includes those areas that provide riparian and aquatic ecosystem functions and connectivity.

2 Within RMZs, management activities (e.g., recreation, permitted uses, structural developments such as livestock water gaps, pipelines, or other infrastructure) should occur at levels or scales that move toward desired conditions for water, soils, aquatic species habitat, and vegetation within the sub-watershed in which the management activity is taking place, and align with the most current regional riparian strategy.[6] Activities and facilities with a small footprint (e.g., access points, intermittent livestock crossing locations, water gaps, or other infrastructure) may be necessary to manage larger scale impacts within the RMZ, recognizing there may be trade-offs between activities and resources.

3 Management activities, including vegetation treatments, in riparian areas should only be implemented to maintain or restore the diversity of both native riparian plant species and vegetation structure. Activities within riparian areas should avoid or otherwise mitigate adverse impacts to the abundance and distribution of desirable native species. Some exceptions may occur if vegetation treatments are needed to protect property or cultural sites.

4 Plantings to reestablish native riparian vegetation should use local sources and occur only if natural regeneration is not sufficient to provide shading, bank cover, and streambank stability. For seeding, only certified, weed-free native seed mixes of local species varieties should be used when commercially available.

5 Downed woody material in stream channels should be retained except where safety is a concern (e.g., sections of streams where rafting is likely).

6 The use of motorized equipment should be avoided in the RMZ except when there is a designated stream crossing or when short-term uses are required to improve resource conditions and maintain infrastructure. Use site-specific conditions to delineate a subset within an RMZ where equipment should be excluded around perennial and intermittent streams. Motorized equipment working within the RMZ should be completely clean of petroleum-based fluid residue or use eco-friendly, biodegradable, and nontoxic hydraulic fluids. Lubricants and fuels should be sealed such that inundation by water should not result in leaks.

7 Herbivory of riparian plants should not cause long-term trends away from desired riparian conditions.

[6] The current regional strategy is the Riparian and Aquatic Ecosystem Strategy Southwestern Region of the Forest Service and its supplement, Existing and Desired Conditions for Riparian and Aquatic Ecosystems (USDA FS 2019a and USDA FS 2019b)

8 Connectivity within FSR should be restored or maintained by protecting ecological functions, tree density and growth, and native understory, to reduce the risk of predation and nest parasitism, and to provide habitat for at-risk and other wildlife species.

9 In FSR types, fuelwood cutting or wood removal should be managed to protect understory species, maintain tree density (including wildlife cover and stream shading), promote large woody material recruitment, and avoid channel downcutting and accelerated erosion.

10 In FSR, large mature cottonwood trees should be protected from management activities that could degrade them as suitable habitat for at-risk species. Projects occurring in these areas should incorporate restoration prescriptions, to ensure persistence of this habitat type.

Management Approaches for Riparian and Wetland Ecosystems **(FW-RWE-MA)**

1. Pursue partnerships for collaborative management of riparian and wetland areas.
2. Collaborate with partners to communicate the ecological significance of riparian and wetland systems to the broader public and to garner support for restoration activities.
3. Consider regional riparian and aquatic ecosystem strategies when formulating riparian management actions.
4. Consider underlying causes for degradation at the watershed scale when planning or implementing restoration activities.
5. Consider working with partners to develop wetland action plans for headwater wetland restoration projects to addresses wetland stressors by identifying and prioritizing mitigation and restoration actions.

Wildlife, Fish, and Plants

"Great diversity of wildlife: birds (red-tailed hawks, ravens), bears, bobcats, elk, squirrels with tufted ears, Jemez salamanders; seeing a mountain lion take down a deer."

(Public comment during the Assessment, spring 2014)

"The Santa Fe NF has a critical role providing for the protection and restoration of habitats for listed species in northern New Mexico."

(Public comment on the Notice of Intent, summer 2016)

At least 1,350 known native plant and animal species are found in the Santa Fe NF, all of which can be classified as either terrestrial (living mostly on land) or aquatic (living mostly in water). These species provide the biotic foundation of the ecological landscape and are important to local communities. The various plant and animal species found in the forest often provide food, fiber, medicine, and forest products for multiple users, as well as providing cultural services including recreation; opportunities for scientific discovery and education; and cultural, intellectual, or spiritual inspiration. The continued existence of all native species is of utmost importance for both the ecological and socioeconomic health of the forest and its users.

Some wildlife species found in the Santa Fe NF are common nationally (e.g., black bears) or regionally (e.g., Abert's squirrel). Others are restricted to the forest or even more specifically to one of the forest's two mountain ranges (e.g., Jemez Mountain salamander) or even a single canyon (e.g. Holy Ghost ipomopsis). For a few species, changing land use patterns outside the forest boundary has reduced potential habitat availability and increased their reliance on NFS lands.

Species are dependent on the health of their habitats and the Santa Fe NF provides a home for them. Most wildlife, fish, and plants in the forest are not known to be at-risk. These species are managed using broad-scale management strategies that address habitat needs (e.g., vegetative components, water characteristics, etc.) or attempt to reduce broad-scale threats (e.g., uncharacteristic wildfire, introduction of invasives or pathogens, etc.). The most important direct drivers of change in plant and animal populations are habitat change (e.g., land use changes, disruption of natural processes, physical modification of rivers or water withdrawal from rivers, lack of connectivity, or disease), climate change, invasive species, overexploitation, and pollution. Changes to ecological conditions can occur naturally through large-scale disturbance or unnaturally through direct or indirect consequences of forest management. Changing ecological conditions in and outside the forest have and can continue to impact the plant and animal species in the forest, both in overall numbers (population) as well as what species are found (biodiversity). The plan addresses species-specific threats, but more commonly provides guidance to maintain or enhance ecological conditions that are most important for species viability.

The Santa Fe NF is primarily responsible for providing habitat to maintain species populations and diversity on NFS lands. The Forest Service has ultimate responsibility over NFS lands, but the New Mexico Department of Game and Fish (NMDGF) and the U.S. Fish and Wildlife Service (USFWS) are the lead agencies responsible for managing most wildlife populations in New Mexico. The USFWS has primary responsibility for managing Federal endangered and threatened species, as well as migratory birds, while the NMDGF is responsible for managing all other protected vertebrates, mollusks, and crustaceans. Terrestrial and aquatic species and habitats are managed in conjunction with other resources according to the Multiple Use Sustained Yield Act of 1960 (Public Law 86-517). For Federal endangered and threatened species in the Santa Fe NF, habitat management and

compatible multiple uses are determined in accordance with Section 7 of the Endangered Species Act, as amended (Public Law 93-205).

Wildlife, fish, and plants are grouped into four main categories: aquatic, terrestrial, at-risk, and invasive species. The first three groupings (aquatic, terrestrial, and at-risk[7]) are managed for their persistence and recovery in the forest, while the last grouping (invasive) is managed for eradication or control, because they are not native flora and fauna.

The myriad of plant and animal species found in the Santa Fe NF provide ecosystem services that in turn benefit society as a whole. These include ecosystem supporting services such as nutrient cycling (by plants, animals, and invertebrates), soil formation and manipulation (e.g., burrowing insects and mammals), primary production (plants), and seed dispersal (e.g., animals). Regulating ecosystem services including carbon sequestration (plants), pollination (both forest plants and adjacent croplands by vertebrates and invertebrates), and erosion control and water storage (plants) are additional key ecosystem services provided. Species also provide provisioning ecosystem services such as food (e.g., forage, game, and wild foods), fiber, medicine, and forest products. Finally, some species provide cultural ecosystem services including recreation (e.g., hunting, fishing, and bird-watching); opportunities for scientific discovery and education; and cultural, intellectual, or spiritual inspiration.

[7] At-risk species include both federally listed species and species of conservation concern (SCC). Federally listed species' habitat is managed to move toward recovery and SCC habitat is managed to maintain their persistence on the forest.

Aquatic Species and Habitats

Aquatic plant and animal species include commonly found species that spend all or the majority of their lives in water features in the forest (e.g., streams, springs, and pools) and are usually represented by fish (e.g., trout, chubs, etc.), amphibians (e.g., frogs, salamanders, etc.), and water-dependent plants (e.g., cattails, lily-pads, etc.) and macro-invertebrates (e.g., aquatic insects, clams, etc.). These animals are both native and non-native to the Santa Fe NF, and their persistence on the forest is desirable.

Desired Conditions for Aquatic Species and Habitats **(FW-AQUASH-DC)**

1 Aquatic habitats are distributed across the forest in sufficient quantity (redundancy and size) and with appropriate habitat components to support self-sustaining populations of native fish and other aquatic species. Nonnative sportfish are supported in stream reaches where there is strong recreational interest and where they do not conflict with native species repatriation efforts. High-quality habitat consists of:

- a Pool-to-riffle ratio of at least 30 percent of the stream reach.
- b Pool quality with average residual pool depth of 12 or more inches.
- c Less than 20 percent fines (sand, silt, clay) in riffle habitat.
- d Appropriate width-to-depth ratios for the stream channel type (Rosgen or equivalent).
- e Streambank condition is less than 10 percent unstable banks (lineal streambank distance).
- f At least 60 percent of woody riparian cover consists of at least three native plant species or where soil characteristics do not support woody vegetation, native obligate wetland species dominate herbaceous bank cover.
- g In forested streams, large woody debris consists of more than 30 pieces per mile, larger than 12 inches in diameter, and over 35 feet in length.
- h Large-diameter trees and snags near stream channels and riparian areas exist in a quantity that provide for recruitment of large woody material to stream channels.

2 Aquatic habitats and waterbodies (e.g., lakes, ponds, and reservoirs) support a complete assemblage of native aquatic species and are resilient to natural and human disturbances including projected warmer and drier climatic conditions. Habitat resiliency is maintained or increased when:

- a Undesired and invasive aquatic species, as well as introduced pathogens, are rare or absent (per Desired Condition 1 in Wildlife: Nonnative and Invasive Species).
- b Desirable nonnative fish exist in less than 50 percent of aquatic habitats across the forest and provide for a broad range of sport-fishing opportunities.
- c Water quality and quantity meet designated uses, consistent with water rights and site capability.

3 Aquatic habitats are spatially distributed across the forest to support genetically diverse populations of native species and long-term viability.

4 Aquatic species' habitat conditions provide redundancy necessary to maintain species biodiversity and functioning metapopulations (an interconnected group of subpopulations separated by space but consisting of the same species).

   a Aquatic habitats are connected and free from alterations (e.g., temperature regime changes, lack of adequate streamflow, and barriers to aquatic organism passage) to allow for species migration, connectivity of fragmented populations and genetic exchange. Barriers to movement are located where necessary to protect native fish from nonnative species.

Objectives for Aquatic Species and Habitats **(FW-AQUASH-O)**

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

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

Standard for Aquatic Species and Habitats **(FW-AQUASH-S)**

1 Equipment must not be refueled within or adjacent to the stream channel.

Guidelines for Aquatic Species and Habitats **(FW-AQUASH-G)**

1 Except where barriers are beneficial and necessary to achieve conservation goals for aquatic species, fragmentation of aquatic habitats and isolation of aquatic species should be avoided and passage for aquatic organisms should be maintained.

2 Human-made structures (e.g., instream structures or fencing) should be maintained to support the purposes for which they were built or removed when no longer needed.

3 Projects and management activities within aquatic and riparian systems should be designed or managed to maintain high-quality aquatic habitats (as per Desired Condition #1).

4 Management of coldwater streams should include adequate vegetation cover (as defined by Desired Conditions within the Riparian Ecosystems section) and width-to-depth ratio to move toward State of New Mexico standards for stream water temperatures for "High Quality Coldwater" systems.

5 Management activities negatively impacting vital functions (e.g., reproduction or migration) of native or sport fish species, as well as amphibians, should be avoided except when short-term impacts are required to improve resource conditions and maintain infrastructure.

Management Approaches for Aquatic Species and Habitats **(FW-AQUASH-MA)**

1. Work collaboratively with the New Mexico Department of Game and Fish, government institutions (local, State, Tribal and Federal), and other organizations, individuals, and groups to plan and implement projects for the management and research of fish and other aquatic species and their habitats.
2. Work with partners to develop and implement conservation strategies beneficial to aquatic habitats (e.g., Rio Grande Cutthroat Conservation Strategy, the State Wildlife Action Plan, etc.).
3. During project planning, consider management actions to mitigate the effects of long-term and short-term climate fluctuations (e.g., climate change, drought, and El Niño Southern Oscillation).
4. Prioritize restoration projects based on factors such as watershed conditions, at-risk species, restoring aquatic habitat connectivity, restoration after disturbances (e.g., fire or flood), partner interest, and other immediate needs.
5. Work with partners to promote public education and valuing of the aquatic wildlife in the forest.
6. Consider constructing beaver dam analogues to create similar beneficial conditions for aquatic and riparian habitats as reintroducing beavers while avoiding potential conflicts with adjacent land management.

Terrestrial Species and Habitats

Terrestrial plant and animal species include commonly found species that spend all or the majority of their time on dry land and are usually represented by mammals (e.g., deer, rabbits, etc.), birds (e.g., eagles, jays, etc.), reptiles (e.g., snakes, lizards, etc.), and land-based plants (e.g., trees, grasses, etc.) and macro-invertebrates (e.g., beetles, snails, etc.). These animals are native to the forest and are not considered invasive nor is their persistence in the forest of concern.

Desired Conditions for Terrestrial Species and Habitats **(FW-TERRASH-DC)**

1 Terrestrial ecosystems are composed of appropriate (native) assemblages of sustainable populations of plant and animal species that are supported by healthy ecosystems.

   a A diversity of habitat components, including biotic and abiotic features, are available at the appropriate spatial, temporal, compositional, and structural levels (as defined by Desired Conditions for each Vegetation ERU) to provide adequate opportunity for breeding, feeding, nesting, and other critical life history needs of wildlife, so that forest species remain viable and persistent on the landscape.

   b Undesired nonnative and invasive terrestrial species, as well as introduced pathogens, are rare or absent (per Desired Condition 1 in Wildlife: Nonnative and Invasive Species).

   c Terrestrial habitats allow for the maintenance and promotion of interspecific relationships at all trophic levels (e.g., producer-consumer and predator-prey relationships) across multiple scales, consistent with existing landforms and topography.

2 Habitat configuration, connectivity, and availability allow wildlife populations to adjust their movements in response to major disturbances (e.g., climate change or uncharacteristic fire) and promote genetic flow between wildlife populations.

3 Wildlife are free from harassment and human disturbance at a scale that does not impact vital functions of populations (e.g., breeding, feeding, rearing young, migration, and dispersal) resulting in a negative impact to the persistence of the species in the forest.

Objectives for Terrestrial Species and Habitats **(FW-TERRASH-O)**

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

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

Standard for Terrestrial Species and Habitats **(FW-TERRASH-S)**

1 Constructed water features (e.g., water tanks and, cattle guards) must provide safe access and escape for wildlife, such as ramps or other climbing features.

Guidelines for Terrestrial Species and Habitats **(FW-TERRASH-G)**

1 Human-made structures (e.g., fences, steel posts, or vent pipes) should be constructed and maintained to minimize wildlife mortality (e.g., capped fence posts) and removed when no longer needed.

2 Infrastructure (e.g., fences and roads) should be designed, modified, or removed to minimize impacts on wildlife movement and improve habitat connectivity.

3 Activities negatively impacting wildlife reproduction or other vital functions should be minimized (e.g., closures during elk calving), except if management activities are implemented to control wildlife populations to protect the overall health of the habitat or other populations (e.g., NMDGF regulations).

4 Management activities that inhibit the reproduction of an individual raptor (disturbing the same nest site) should be avoided in successive years (e.g., via the development of species-specific distance buffers focusing around known nest sites).

Management Approaches for Terrestrial Species and Habitats **(FW-TERRASH-MA)**

1. Work collaboratively with the New Mexico Department of Game and Fish and other organizations, government institutions (local, State, Tribal, and Federal), individuals, and groups to plan and implement projects for the management and research of wildlife and their habitats, including Rocky Mountain bighorn sheep.
2. Collaborate with other adjacent land ownership to encourage an all-lands approach at a scale that improves landscape connectivity across mixed ownerships where natural systems span multiple administrative boundaries.
3. Consider seasonal road restrictions and area closures to provide refuge in small and large blocks of land for a wide range of species.
4. During project planning, consider mitigations to wildlife habitat resulting from the effects of long-term and short-term climate fluctuations (e.g., global climate change, drought, El Niño Southern Oscillation), and subsequent effects of management activities.
5. Work closely with New Mexico Department of Game and Fish, other enforcement agencies and local communities to reduce incidence of poaching (e.g., encourage reporting, increase signage or maintain barriers for road closures).
6. Work with partners to promote public education and valuing of the terrestrial wildlife in the forest.
7. Work collaboratively with New Mexico Department of Game and Fish and New Mexico Department of Transportation as well as other organizations to identify corridors to improve or maintain connectivity for terrestrial species.
8. Work with partners to develop and implement conservation strategies beneficial to terrestrial habitats (e.g., the State Wildlife Action Plan, etc.).

Nonnative Invasive Species

Although the majority of species have evolved in the Santa Fe NF, certain species of terrestrial and aquatic plants and animals are considered invasive and are not desired in the forest. Invasive species include both aquatic and terrestrial plant or animal species that are nonnative (or alien[8]) to the ecosystem under consideration, and which introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112). Invasive species generally possess one or more of the following characteristics: aggressive and difficult to manage; poisonous; toxic; parasitic; a carrier or host of serious insect or disease; and being nonnative, new, or not common to the United States or parts thereof. Invasive species pose an increasing threat to the integrity of ecosystems by decreasing native plant and animal diversity, increasing soil erosion and sedimentation, interfering with natural fire regimes, and threatening the quantity and quality of forest goods and services. Landscapes free of invasive species tend to be more resilient and have a greater capacity to survive natural disturbances in uncertain future environmental conditions, such as those affected by climate change and increasing human uses. Due to their negative impact on the ecosystems, invasive species are managed for their removal or reduction.

Desired Conditions for Nonnative Invasive Species **(FW-INVASIVE-DC)**

1 Invasive species (including pathogens) are nonexistent or exist at population levels that do not disrupt ecological functioning, affect the sustainability of native species, cause economic harm, or negatively impact human health.

2 Nonnative species do not conflict with the recovery of native species, negatively influence ecosystem function, or detract from existing multiple uses.

Objective for Nonnative Invasive Species **(FW-INVASIVE-O)**

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

Standards for Nonnative Invasive Species and Habitats **(FW-INVASIVE-S)**

1 Forest management actions must apply best management practices (e.g., Forest Service Handbook, Region 3 Soil and Water Conservation Practices Handbook) to minimize the introduction or spread of invasive species, including:
   a Decontamination procedures on vehicles and equipment used in terrestrial and aquatic environments.
   b Using weed-free products

2 Projects and authorized activities must be designed to reduce the potential for introducing new species or spreading existing invasive or undesirable nonnative species.

3 Agency and permitted pack-animal users must use pelletized feed.

4 Treatment approaches must use integrated pest management practices to treat noxious and invasive species.

[8] Some nonnative species are desirable and were intentionally released into the wild to establish self-sustaining populations of wildlife that meet public demands for recreation or other purposes (e.g., sport fishes). These desirable nonnative species are not likely to cause ecosystem disruption and are not addressed in this section.

Guidelines for Nonnative Invasive Species **(FW-INVASIVE-G)**

1 Certified, weed-free native seed mixes of local species varieties should be used for revegetation when commercially available. Sterile, nonnative, non-invasive plant material that does not persist long term may be used in limited situations where considered necessary to protect resources and stabilize soils in a timely fashion.

2 Equipment and materials should be stored or staged in areas that are not infested with invasive weeds or other nonnative species.

3 Projects should use locally chipped and shredded woody materials for mulch or, if necessary, use certified weed-free mulch.

4 Management activities should implement procedures to prevent the spread of insects and diseases that impact ecosystem function (e.g., the New Mexico Department of Game and Fish's Aquatic Invasive Species Program and Clean, Drain, and Dry guidelines).

5 As part of project implementation, new populations of invasive species found within the project area should be reported and recorded.

Management Approaches for Nonnative Invasive Species **(FW-INVASIVE-MA)**

1. Coordinate with the NMDGF and other agencies and pursue partnerships to manage terrestrial and aquatic invasive species.
2. Consider educating and informing the public to prevent the introduction of invasive species and limit their spread.
3. Encourage research on invasive species and pathogens by universities and other organizations and agencies. Coordinate with university research and programs such as the Cooperative Extension Service through New Mexico State University.
4. Consider using the most recent New Mexico Department of Agriculture's "Noxious Weed Memo and List" to identify and prioritize invasive plant management needs. The invasive species with the highest treatment priority are Class A and B noxious weeds, which have made significant increases in their overall population size in the plan area during the last 10 years.
5. Consider programs to address invasive plant species using integrated pest management strategies.
6. Consider encouraging public land users to inspect and clean motorized and mechanized trail vehicles of weeds and their seeds before recreating on public lands.
7. Consider encouraging fishers and hunters to prevent the introduction and spread of invasive species by inspecting their equipment for invasive species and taking preventative measures (e.g., do not use felt-sole wading boots).
8. Consider encouraging public pack-animal users to use pelletized, weed-free feed.

At-Risk Species

Although most forest species appear to be thriving, there are a number of species whose continued persistence in the Santa Fe NF is of concern. At-risk species include both aquatic and terrestrial species whose persistence is known to be at-risk. Their identification allows us to better address their ecological needs in the plan. At-risk species consist of (1) federally recognized threatened, endangered, proposed, and candidate species, and (2) species of conservation concern. Species of conservation concern are native to and known to occur in the Santa Fe NF; and for which there is substantial concern about their ability to persist in the forest based on best available science information. Species of conservation concern are identified by forest staff with assistance from their partners (government agencies, non-governmental organizations, and other members of the public) and approved by the Regional Forester.

At-risk species are found within all the forest's ERUs. Although some plant, invertebrate, and aquatic species may be found in only one specific ERU, most terrestrial at-risk species use multiple ERUs to complete their basic life-cycle needs. Foraging needs and breeding behaviors of at-risk species often require animals to travel considerable distances spanning multiple ERUs. For example, northern goshawk typically nest in ponderosa pine or mixed conifer forests, but are often found feeding in riparian areas; therefore, vegetative conditions trending toward desired conditions in all three of those ERUs will increase or maintain viability for that species. For a complete listing of ERU use by at-risk species, see appendix C.

Although not considered at-risk (federally listed or species of conservation concern), some species need additional protections due to their scarcity or limited habitat. Rare species are those that are very uncommon, scarce, or infrequently encountered even though they may not be endangered or threatened. Endemic species are found only in a given region or location and nowhere else in the world. Although rare and endemic species may not be at-risk, their naturally low population numbers or limited geographic distribution may elicit the need to manage them similar to at-risk species.

Desired Conditions for At-Risk Species **(FW-ATRISK-DC)**

1 Ecological conditions (physical and biotic) contribute to the survival and recovery of federally listed, proposed, and candidate species; preclude the need for listing new species; and allow for the recovery and persistence of species of conservation concern.

2 Intact, functioning, and sufficient habitat for terrestrial and aquatic at-risk species (defined by Desired Conditions for each Vegetation ERU) provide for opportunity for breeding, feeding, nesting, and other critical life history needs of wildlife, so the species remains viable and persistent on the landscape.

3 Habitats for at-risk species, including rare and endemic populations, are known (locations) to be intact, functioning, well-connected, and sufficient for species' persistence and recovery.

Guidelines for At-Risk Species **(FW-ATRISK-G)**

1 All authorized activities should be designed and implemented to address threats to at-risk species and their habitats, including, but not limited to:

   a Timing restrictions to encourage reproductive success;

   b Prevention of introduction of non-game invasive, competing, or predatory species (these are species directly and negatively impacting at-risk species populations), and prevention of introduction of nonnative game species to novel locations;

   c Prevention or introduction of pathogens leading to population impacts;

   d Creation or removal of obstructions that may alter natural migration or directly cause mortality to wildlife; and

   e Avoiding or protecting small or isolated populations.

2 Project activities and special uses occurring within federally listed species' habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan. Deviation from recovery plans may occur through consultation with U.S. Fish and Wildlife Service personnel.

3 Where the Forest Service has entered into signed conservation agreements that provide guidance on activities or actions to be carried out by the forest, those activities or actions should be undertaken consistent with the guidance found within those conservation agreements.

4 Within habitat for threatened and endangered species, footprints of ground-disturbing fire suppression activities should be as small as possible or located where ground disturbance has previously occurred.

5 The forest should use the most current ecological guidelines to improve nesting conditions for goshawk (*Accipiter gentilis*):

   a A minimum of three goshawk nest areas and three replacement nest areas should be located per goshawk territory. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (northwest to northeast) aspects. Nest areas should generally be 25 to 30 acres in size.

   b Goshawk post-fledging areas of approximately 420 acres should be designated surrounding nest sites.

   c In goshawk foraging areas and post-fledging family areas, groups of three to five reserve trees should be retained within management-created openings greater than 1 acre in ponderosa pine communities, and six reserve trees (VSS class 5 or 6) should be retained within management-created openings greater than 0.5 acre in spruce-fir communities.

   d In occupied goshawk nest areas, human presence should be minimized between March 1 and September 30 (per Guideline 1a in this section).

6 Management activities along cliff faces, rock features, and other known nesting sites should avoid impacts during nesting season (March 1 through August 15 as per Guideline 1a in this section) to the same nesting site in consecutive years for at-risk bird species.

7 As part of project implementation, new populations of at-risk, as well as rare and endemic species, found within the project area should be reported and recorded.

8 Heavy equipment should be kept out of streams during spawning, incubation, and emergence periods (e.g., spring to early summer for fish species) of aquatic at-risk species (per Guideline 1a in this section) except when short-term uses are required to improve resource conditions and maintain infrastructure.

9 Management of coldwater streams with populations of at-risk species should include adequate vegetation cover and width-to-depth ratio to move toward a 7-day average maximum water temperature of less than 17.8 degrees Celsius.

10 In areas that produce piñon seeds, mitigation measures for the collection of forest products (e.g., collection of dead or down, tree diameter restrictions, restrictions on size of fuelwood area) should be used to reduce impacts to piñon-producing trees and benefit at-risk species.

11 Even-aged management treatments in piñon-juniper habitat should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands for foraging habitat of at-risk species.

12 Large mature cottonwood trees should be retained as habitat for at-risk species unless necessary to meet management objectives or ensure public safety.

13 Closures or other means to reduce the threat to at-risk species should be implemented in areas where recreational activities (e.g., target shooting or climbing) are known cause harm.

14 Management actions that reduce long-term nesting success or directly harm populations of at-risk bird species in alpine and tundra habitats should be avoided or mitigated.

Management Approaches for At-Risk Species **(FW-ATRISK-MA)**

1. Work collaboratively with other agencies (e.g., USFWS, NMDGF, New Mexico State Forestry, etc.), universities, and nongovernmental organizations for the research and management of at-risk species. Emphasis is placed on the protection and restoration of key habitats and habitat features that lead to their recovery and persistence.
2. Strive to work with partners to promote public education and valuing of the at-risk species in the forest.
3. Prior to management actions, conduct surveys to identify sessile (immobile) at-risk species in areas with the following features:
    - Limestone outcropping
    - Gypsum soils
    - Sandstone blended with Todilto gypsum or limestone
    - Gray to red shales and clays of the Mancos and Chinle formations in piñon-juniper woodlands
    - Volcanic pumice and unconsolidated pyroclastic ash in piñon-juniper woodland and lower montane coniferous forests

4. Consider guidance from regional or local species conservation agreements, assessments, strategies, or guidelines to improve the status of at-risk species.
5. Consider using geographic information systems (GIS) as the preferred database of record to record findings of at-risk species, including negative surveys.
6. In coordination with New Mexico Department of Game and Fish, consider "dusting" prairie dog colonies with flea-controlling powder to reduce the spread of sylvatic plague, or distributing sylvatic plague vaccine. When possible, identify and potentially avoid burrows occupied with at-risk species prior to application.
7. Collaborate with universities, State and Federal agencies (e.g., Forest Service Research and Development, U.S. Geological Survey, Natural Resources Conservation Service, New Mexico State Forestry, New Mexico Department of Game and Fish), and other organizations (e.g., The Nature Conservancy, Natural Heritage New Mexico, Native Plant Society of New Mexico, Trout Unlimited, Audubon Society, and other non-governmental organizations), to obtain data and encourage research on rare and endemic species.
8. Consider alternative measures to projects that may decrease the likelihood of disease introduction or spread to at-risk species (e.g., do not dip firefighting buckets in waterbodies where didymo or whirling disease is known to exist or install drinkers instead of earthen tanks to prevent the spread of Chytrid fungus).
9. Consider working with partners to promote public education and valuing of rare and narrow endemic species in the forest.

Soil Resources

"Soils are the most unique and valuable natural resource, sustaining life from beneath our feet."

(Estella Smith, Acting Soil and Water Program Manager for the Santa Fe NF)

Soil is a complex and dynamic system consisting of a mineral component, organic matter, air, water, and various soil organisms that, together, support life. Properly functioning soil systems cycle nutrients, water, and energy within forest and grassland ecosystems. Because of their slow rate of formation, soils are essentially a non-renewable resource.

Across the Santa Fe NF, soil temperature-moisture regimes vary from warm-dry at lower elevation grasslands to cold-moist alpine tundra at the highest elevations. Soils in the forest are inventoried and classified into 209 terrestrial ecosystem units (TEUs) based on climate, vegetation, geology and landform (Miller et al. 1993).

Soil condition provides an overall picture of soil health and is based on the ability of soils to resist erosion, infiltrate water, and recycle nutrients. Satisfactory soil condition ratings, found in approximately 77 percent of the forest, are assumed to represent historical conditions prior to any effects of management or disturbance. Unsatisfactory soil condition ratings, found in 18 percent of the Santa Fe NF, indicate unstable soils with reduced nutrient cycling, which contributes to reduced soil fertility. Unsatisfactory soil conditions are generally found in lower elevations; specifically, piñon-juniper grass, piñon-juniper sagebrush, and sagebrush shrubland ERUs. These unsatisfactory soil conditions are likely due to a lack of effective vegetative ground cover and organic matter.

The majority of the soils in the Santa Fe NF fall into the severe soil erosion hazard class (51 percent) and much of the remainder falls into the moderate soil erosion hazard class (48 percent). Although soil erosion hazard is an inherent property and not influenced by management, soil is generally at risk in areas where severe soil erosion hazards coexist with high fuel loadings (high risk of wildfire). Here there may be accelerated erosion and decreased site productivity, especially when combined with drought.

Soil provides many ecosystem services on which humans and other life forms depend. Supporting ecosystem services are probably what first come to mind when considering soil's contributions. Soil offers physical support to plants and are the foundation for ecosystem diversity. Soils also provide diverse habitats for microorganisms, invertebrates, fungi, and bacteria, which cycle nutrients and energy. Two key regulating ecosystem services provided by healthy soils are water supply and release, including flood mitigation, and maintenance of water quality. Satisfactory soil condition ratings indicate that water can infiltrate the soil and mitigate large overland flows or floods downstream, as well as recharge groundwater. Soils are also among the largest pools for carbon storage, another regulating ecosystem service. The protection of soils in satisfactory conditions and improvement of soils in unsatisfactory conditions will positively impact the ecosystems within the Santa Fe NF, and will ensure that ecosystem services continue to be provided into the future.

Desired Conditions for Soil Resources (**FW-SOIL-DC**)

1 Soil productivity, function, and inherent physical, chemical, and biological processes remain intact or are enhanced. Soils can readily absorb, store, and transmit water vertically and horizontally; accept, hold, and release nutrients; and resist erosion.

2 Vegetative cover and litter are distributed across the soil surface in adequate amounts to limit erosion and contribute to soil deposition, development, productivity, and carbon cycling. Soil cover and herbaceous vegetation protect soil, facilitate infiltration, and contribute to plant and animal diversity and ecosystem function.

3 In forested areas, logs and other woody material are retained and distributed across the soil surface to facilitate soil productivity and maintain key habitat features.

4 Relatively undisturbed biological soil crusts (i.e., soil consisting of cyanobacteria, lichens, mosses, and algae organisms) are present or enhance recovery where the potential exists.

5 Soil productivity is not inhibited by invasive plant species.

6 Soils are free from contaminants that could alter ecosystem integrity or affect public health.

7 Soils do not exhibit accelerated or unnatural signs of erosion (e.g., pedestaling, rills, or gullies caused by human uses).

Standard for Soil Resources **(FW-SOIL-S)**

1 Best management practices (BMPs; e.g., National Core Technical Guide for BMPs (FS-990A), FSH 2509.22 - Soil and Water Conservation Practices Handbook) and soil quality monitoring (e.g., Technical Guidance for Assessing and Monitoring Soil Quality in the Southwestern Region) must be used to minimize management impacts to ensure long-term soil productivity and satisfactory soil condition (soil health).

Guidelines for Soil Resources (**FW-SOIL-G**)

1 Ground-disturbing management activities should be designed to minimize short- and long-term adverse impacts to soil resources (e.g., soil compaction and soil loss). Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed. When soil conditions are less than satisfactory as a result of management activities, restoration of soil condition should occur.

2 During forest management activities such as thinning and prescribed fire, large woody material should be retained to meet desired conditions relevant to the ERU to support nutrient cycling.

3 In project areas where ground disturbance could affect biological soil crusts, intact soil crusts should be identified and protected as source populations.

4 In areas where soils have a severe erosion hazard rating (as defined in the TEUI) or are poorly drained or saturated or unsatisfactory soil condition, new activities that encourage concentrated use (e.g., recreation, log landings, stock tanks, mineral blocks, corrals, and cattle collection areas) should be avoided.

5 On soils classified as Mollisols (soils with relatively thick organic surfaces) within all piñon-juniper ERUs, manage areas as grasslands by removing woody encroachment, because these soils are typical of and generally develop under grassland conditions.

Management Approaches for Soil Resources **(FW-SOIL-MA)**

1. Work collaboratively with other agencies and groups that facilitate soil conservation, watershed improvement, and research projects.
2. Consider developing and promoting programs that educate the public on the importance of staying on trails and not disturbing natural plant communities including biological soil crusts (e.g., Don't Bust the Crust!).
3. Consider updating the TEUI (Miller et al. 1993), which provides the basis for planning project activities. Work with the Natural Resources Conservation Service and other partners to share data and improve existing soil information, especially after large-scale soil disturbances.
4. Consider improving impaired and unsatisfactory soil condition ratings (as defined by TEUI) where management has resulted in degraded conditions:
    - To restore productivity and hydrologic function of compacted soils, consider using low ground pressure equipment.
    - To restore productivity and nutrient cycling, consider the application of soil amendments (e.g., biochar).
5. Consider mitigating or restoring negative impacts in areas where concentrated use occurs on soils with severe erosion hazard rating or are poorly drained or saturated.

Air

"What do I value about the Santa Fe NF? The beauty, clean air, and quiet."

(Public comment during the Assessment phase, spring 2014)

Air resources on national forests are an important resource to be protected. The national forests provide fresh air, sweeping views, forest health, water quality, and fisheries, all of which can be affected by poor air quality. The goal of air quality management is to meet regulatory standards that protect human health, the environment, and visibility, as well as address and respond to other air quality concerns, such as atmospheric deposition of pollutants in the forest.

Human health and environmental standards are defined in the National Ambient Air Quality Standards (NAAQS) set by the Environmental Protection Agency (EPA) for six common pollutants that are harmful to public health and the environment: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter (PM_{10} and $PM_{2.5}$). PM_{10} is particulate matter with a diameter of 10 micrometers or less and $PM_{2.5}$ is particulate matter with a diameter of 2.5 micrometers or less.

To protect visibility in the national parks and wilderness areas, Congress designated all wilderness areas over 5,000 acres and all national parks over 6,000 acres as mandatory Federal Class I areas in 1977, subject to the visibility protection requirements in the Clean Air Act. The Class I areas most likely to be impacted by activities in the Santa Fe NF are the Pecos and San Pedro Parks Wilderness Areas managed by the Santa Fe NF, as well as Bandelier National Monument managed by the National Park Service and the Wheeler Peak Wilderness, managed by the Carson NF.

Air quality and visibility conditions in the Santa Fe NF are within regulatory levels and the trends based on projected emission inventories appear to be stable or improving for most pollutants. In fact, the air quality the public experiences in and around the forest is typically some of the best in the country. The main challenge in the future to both the ambient air quality and visibility in the forest could come from land use both on and off the forest, climate change and drought, which can contribute to windblown and fugitive dust; and wildfires, which can be a significant source of particulate matter.

Air provides a wide variety of ecosystem services across the entire Santa Fe NF. This includes regulating ecosystem services such as air quality, respiration in plants, exchange of biological byproducts, climate control, and carbon and nitrogen cycling. Supporting ecosystem services include protection of wilderness and greater biodiversity throughout. Managing for quality air across the forest also facilitates cultural ecosystem services like recreation and scenery. When air quality is higher overall, visitors are drawn to a broader range of services and features the Santa Fe NF provides.

Desired Conditions for Air **(FW-AIR-DC)**

1 Air quality meets or surpasses New Mexico and Federal ambient air quality standards.

2 Visibility in designated wilderness areas (Class I and sensitive Class II areas) is free of anthropogenic (human-caused) impacts.

3 Good air quality contributes to visibility, human health, quality of life, economic opportunities, quality recreation, and wilderness values.

4 There are no measurable exceedances to water chemistry or disturbances to biotic components due to atmospheric deposition of pollutants.

Guidelines for Air **(FW-AIR-G)**

1 Dust abatement should occur during construction and road projects where dust is a potential effect.

2 During wildfire incidents, techniques to minimize smoke impacts (e.g., public notification, timing of ignitions, mass ignitions, limiting fire spread, etc.) should be used, including the identification of smoke management objectives in the wildfire decision document.

Management Approaches for Air **(FW-AIR-MA)**

1. Work with agencies, organizations, federally recognized tribes, and other entities to actively pursue actions designed to reduce the impacts of pollutants from sources within and outside the forest. These measures may include:
    - Documenting evidence of potential air quality impacts that supports initial and continued compliance with local, New Mexico, and Federal air quality regulations
    - Active membership in local and regional air quality protection stakeholder groups
    - Prevention of Significant Deterioration (PSD) permit review
    - Implementing air pollution mitigations where appropriate
    - Monitoring ambient air quality
    - Supporting visibility monitoring at San Pedro Parks
2. Consider deploying instrument smoke monitors when there is potential for significant impacts to the public.
3. Consider design features, best management practices, or mitigation measures to reduce fugitive dust where needed.
4. When possible, consider using non-potable water for dust abatement strategies.

Partnerships

"For the Santa Fe National Forest to thrive over the next 10-15 years, we will need to work closely with, and tap into the knowledge of, fully engaged partners. To achieve our common goals, we need diverse partners working closely with each other in conjunction with the Santa Fe National Forest. Strong relationships between the Santa Fe National Forest and our partners, including local communities with historic ties to the land, are vital to the sustainable health of the Forest."

(James Melonas, Former Forest Supervisor for the Santa Fe National Forest)

In recent years, the Forest Service has placed a higher priority on the relationships between national forests and surrounding communities. Santa Fe NF partners and users have valuable ideas and knowledge that can expand the forest's capacity to "Care for the Land and Serve People." Extensive public engagement during the development of this plan has provided collective insight from the people who use, benefit from, and are sustained by the Santa Fe NF.

We will continue to actively engage the forest's many public stakeholders through conservation education, working agreements, and partnerships and volunteers, with a particular emphasis on growing the capacity for partnership collaboration around trails, services, and facilities on NFS lands. Partners will continue to build and maintain trails, restore forested and riparian areas, and ensure continued traditional and cultural uses.

Successful implementation of the forest plan will require successful collaborative partnerships with Federal, State, and local governments; federally recognized tribes and pueblos; rural historic communities; land grant-merced and acequia governing bodies; rural historic communities; non-profit organizations; private landowners; youth; and the public. Collaborative partnerships may include identifying, planning, funding, and implementing projects and activities together. Partnerships will improve trust and contribute to projects that best provide for cultural, social, and economic needs while increasing the capacity to do quality restoration work and to develop and provide improved recreation opportunities.

Partnering with others, including across forest boundaries, will create a dynamic of shared work, assets, and ideas that will lead to ecological, social, and cultural projects that benefit the Santa Fe NF and its surrounding communities.

Desired Conditions for Partnerships **(FW-PARTNER-DC)**

1	Partners and volunteers are a collaborative network that increases capacity for managing forest resources, assists in communicating with and educating the public, and is a crucial component to achieving short- and long-term mutually shared goals (e.g., restoration, traditional and cultural uses, and sustainable recreation).
2	Open communication with partners about expectations and partnering opportunities encourages growth in existing relationships and promotes new partnerships. The open exchange of information promotes collaborative development of forest priorities, a connection to place and its history, and a sense of stewardship.
3	Partnerships improve landscape-scale management across ownership boundaries to find solutions to ecological and societal issues.

Management Approaches for Partnerships **(FW-PARTNER-MA)**

1. Management approaches related to partnerships are found throughout this plan, typically as the first management approach for each resource.

Northern New Mexico Traditional Communities and Uses

"Plan direction needs to recognize the historical ties people have with the Santa Fe National Forest and aim to protect historical and contemporary uses… People have been living on and using this land for thousands of years and the forest has continually provided fuelwood, grazing for traditional and economic importance, hunting for subsistence and cultural purposes, and gathering of forest products for religious and ceremonial purposes."

(Public comment on the Notice of Intent, summer 2016)

A traditional community refers to a federally recognized tribe or a land-based rural community that has a long-standing history in and around the lands managed by the Forest Service. There are numerous small unincorporated communities within the boundaries of the Santa Fe NF, as well as several adjacent federally recognized tribes and small incorporated towns and villages. The Santa Fe NF is a community forest and each of these communities is geographically and historically rooted to a particular landscape.

The Santa Fe NF manages the natural resources and landscapes that sustain northern New Mexico traditional communities, their cultures, and traditions. Local heritage, culture, traditions, and values have been handed down over generations and predate control of this area by the United States. Long-standing use of the forest and its natural resources are fundamental to the interconnected economic, social, and cultural vitality of many northern New Mexico inhabitants, including federally recognized tribes, Spanish and Mexican land grants-mercedes and acequias, grazing permit holders, and other rural historic communities. In managing NFS lands, it is important to allow opportunities to engage with the forest staff so that continual use of the forest for cultural and subsistence needs are supported. These important uses or "traditional uses" include:

- Use of common waters (e.g., acequias or irrigation ditches) for drinking, irrigating crops, and watering livestock.
- Use of common pasture for grazing of livestock.
- Use of wood products for fuelwood, building materials, and ceremonial use.
- Collection of soils (e.g., sand, adobe, and micaceous clay) and rocks for building materials and other purposes (e.g., production of crafts and ceremonial use).
- Gathering of plants and plant products for various purposes (e.g., religious, medicinal, and consumption).
- Hunting and fishing for food and ceremonial purposes.
- Religious and ceremonial uses of lands and waters, including for cemeteries, pilgrimages, calvarios, and shrines.
- Recreational uses for weddings, family reunions, and dispersed camping.

Desires for the recognition and preservation of northern New Mexico traditional uses have been an integral part of managing the Santa Fe NF, which is reflected through various documents (e.g., 1987 Santa Fe Land and Resource Management Plan (1987 Forest Plan), 1972 Regional Forester policy memo, 1968 Hassell Report). This forest plan recognizes the intent behind this previous guidance, seeks to build or improve upon past initiatives and continues to recognize and support the traditional uses associated with the forest.

The Santa Fe NF continues to have strong cultural and historic significance to the many diverse peoples and communities who have called northern New Mexico home for many generations. The forest contributes resources and uses that are important to federally recognized tribes and pueblos, land grant communities, acequia associations, traditional Hispanic communities, and many contemporary residents all with historic, cultural, and socio-economic connections to the forest. To this day, these traditional communities retain a strong connection to the land and rely upon the Santa Fe NF and its natural resources to sustain their cultural, spiritual, and economic way of life.

Forest management supports this traditional way of life, which defines the cultural identity of these traditional communities, in light of the changes brought about by public demand from development, tourism, recreation, and extractive use. Successful management of the Santa Fe NF depends on the sustained success of northern New Mexico's traditional communities. The people of northern New Mexico, their culture and traditions, and their knowledge of the land must be recognized and treated as unique resources. When these unique resources are recognized, they become an asset to the agency, and the Forest Service can serve as a viable, helpful, and productive force in maintaining and improving the many positive values inherent in northern New Mexico and its people.

People continue to benefit directly and indirectly from a variety of ecosystem services obtained from the land. These include cultural ecosystem services, such as hunting; fishing; and gathering of forest products, especially fuelwood; and provisioning ecosystem services, which provide necessary goods and services for subsistence such as food, medicine, and the means to heat rural homes in winter. As well as providing the necessary resources to sustain life, these landscapes also form an anchor for those communities, providing people a sense of identity and their place in the world. Generations of families formed communities, adapted to their environment, and developed a way of life dependent upon and complementary to the mountain, upland, and lowland resources at hand. In addition, these activities can provide regulating ecosystem services through controlling wildlife populations and removing fuels to improve forest health.

Federally Recognized Tribes

For much of human history, American Indians were the only people to occupy and use the lands that encompass the Santa Fe NF. Their use of the forest and the surrounding area began with the earliest human occupation of the Western Hemisphere and persists to the present day. The land-based cultures that exist today in northern New Mexico have relied on the forests, valleys, and water of these public lands spanning many generations.

The Federal Government has a trust responsibility to federally recognized tribes that arises from the United States' unique legal and political relationship with tribes. It is a legally enforceable fiduciary obligation on the part of the United States to protect Tribal treaty rights, lands, assets, and resources, as well as a duty to carry out the mandates of Federal law with respect to all federally recognized tribes. This responsibility requires the Federal Government to consider the best interests of the tribes in its dealings with them and when taking actions that may affect them. In meeting these responsibilities, forest managers consult with federally recognized tribes and pueblos as sovereign entities when proposed policies or management actions may affect their interests.

The government-to-government relationship between the Forest Service and federally recognized tribes is distinct from that of other interests and constituencies under a variety of Federal authorities. These authorities direct the agency to administer forest management activities and

uses in a manner that is sensitive to traditional American Indian beliefs and cultural practices, and are integral in our relationship with federally recognized tribes. The plan components in this section are based upon policy and Federal authorities (e.g., American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, 2008 Farm Bill, Tribal Forest Protection Act). A comprehensive list of these authorities can be found in appendix E.

The Forest Service manages diverse landscapes and sites that are culturally important and held sacred by federally recognized tribes. Specific locations in the forest are often held in confidence to protect these important values.

The trust responsibilities are maintained through consultation and engagement between the tribes and the Santa Fe NF. This consultation is critical when proposed activities have a potential to affect Tribal interests, including natural or cultural resources of importance. The Santa Fe NF staff consults with federally recognized tribes and pueblos that have aboriginal territories within and traditional ties to the land now administered by the forest. The Santa Fe NF maintains government-to-government relationships with many of these federally recognized tribes, using a variety of avenues to achieve meaningful consultation, with the preferred method being real-time, in-person dialogue between tribal leaders and forest line officers.

The Santa Fe NF shares a common boundary with the Jicarilla Apache Nation, the Pueblo of Santa Clara, the Pueblo of San Ildefonso, the Pueblo of Santo Domingo, the Pueblo of Jemez, the Pueblo of Nambe, the Pueblo of Tesuque and the Pueblo of Zia, and is near several other Tribal communities.

Desired Conditions for Federally Recognized Tribes **(FW-TRIBES-DC)**

1. The uniqueness and values of the Tribal cultures in the Southwest and the traditional uses important for maintaining these cultures are recognized and valued as important.
2. The long history and ties of Tribal communities and uses to forest lands and resources is understood, appreciated, and is available to the public.
3. Forest resources important for cultural and traditional needs (e.g., osha, piñon nuts, okote (pitch wood), and micaceous clay) as well as for subsistence practices and economic support of tribal communities, are available and sustainable.
4. Tribes have access to sacred sites, traditional cultural properties, and collection areas for traditional and ceremonial use.[9]
5. There are opportunities for solitude and privacy for traditional and cultural activities.[7]
6. Traditional cultural properties, sacred sites, and other locations of traditional and cultural use identified as important to tribes are unimpaired.[7]
7. The forest provides a setting for educating tribal youth in culture, history, and land stewardship, and for exchanging information between tribal elders and youth.

[9] Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (35 U.S.C. 3001).

Standard for Federally Recognized Tribes **(FW-TRIBES-S)**

1 Confidentiality of tribal information and resources collected during consultation must be maintained as allowed by law, unless permission to share this information is given.

Guidelines for Federally Recognized Tribes **(FW-TRIBES-G)**

1 To honor tribal privacy, requests for temporary closure orders for cultural and traditional purposes should be accommodated.

2 Consultation with federally recognized tribes should occur at the early stages of project planning and design, to incorporate tribal perspectives, needs, and concerns, as well as traditional knowledge into project design and decisions.

3 Management activities and uses should be planned and administered to prevent or minimize impacts to the physical and scenic integrity of places that the federally recognized tribes regard as sacred sites, traditional cultural properties, or part of an important cultural landscape.

4 Human remains and cultural items disinterred from National Forest System lands or adjacent sites should be reburied in accordance with the requests of affiliated tribes.[10]

Management Approaches for Federally Recognized Tribes **(FW-TRIBES-MA)**

1. Coordinate with federally recognized tribes to develop collaborative proposals and implement projects of mutual benefit across shared boundaries, and use available federally authorized or advocated programs (e.g., Tribal Forest Protection Act of 2004 (Public Law 108-278) and the Collaborative Forest Restoration Program).
2. Cooperatively develop interpretive and educational exhibits that focus on the history of the lands managed by the Santa Fe NF in collaboration with federally recognized tribes, land grant communities, and rural historic communities to provide the public with a greater understanding and appreciation of our shared history, culture, and traditions.
3. Consider identifying sacred sites or traditional cultural properties, with tribal permission, and developing a strategy for appropriate recognition and management, including honoring the tribes' request for maintaining confidentiality.
4. Consider providing training to forest employees so they gain an understanding of the unique government-to-government relationship between the Federal Government and federally recognized tribes; American Indian laws, customs, traditions, and values; and the tools available for protecting and managing sacred sites and traditional cultural properties.
5. Refer tribal requests to collect threatened and endangered species to the U.S. Fish and Wildlife Service, the agency responsible for issuing permits for listed threatened and endangered species.
6. Consider the physical and scenic integrity of places that federally recognized tribes regard as sacred sites, traditional cultural properties, or as part of important cultural landscapes when

[10] Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (35 U.S.C. 3001).

making project decisions or issuing special-use authorizations regarding the approval, location, and maintenance of facilities (e.g., telecommunication sites, ski areas, and recreational trails).

7. Consider holding a workshop to inform interested tribes of Tribal Forest Protection Act provisions and opportunities for collaboration.
8. Formalize working agreements with federally recognized tribes to understand their needs and build respectful, collaborative relationships; to develop ways of accomplishing mutually desired conditions and objectives; and to collaborate in ecosystem restoration efforts (such as memoranda of understanding, stewardship, and contracts).
9. Consider identifying locations in the forest that can provide a setting for educating youth in culture, history, land stewardship, and the health benefits of outdoor activities.
10. Consider acknowledging locations identified as important by federally recognized tribes and managing them with an emphasis on the resilience and protection of natural and cultural resources.
11. Consider working with tribes to understand community needs and build respectful, collaborative relationships to achieve mutually desired conditions.
12. Consider incorporating native language (e.g., Tanoan, Keres, and Athabaskan) into interpretive materials to highlight the American Indian culture as part of the landscape of the forest and its surrounding areas.

Rural Historic Communities

A rural historic community refers to the many peoples of northern New Mexico whose families have strong historical ties to the land. The Santa Fe NF and use of its resources are integral to the subsistence, cultural, and social values that help define these people and communities. The founding of the community generally predates the establishment of the Santa Fe NF or is coincident with the historic development of extractive activities such as logging, mining, ranching, and farming. Communities have a significant concentration of human activity, linkage, and continuity of land use on and/or immediately adjacent to the forest. The day-to-day occupational activities of rural historic communities are rooted in the pragmatic need to make a living. They evolved on a specific landscape within or adjacent to lands now managed as the Santa Fe NF.

Occupational, subsistence, and cultural-based activities associated with rural historic communities may include livestock grazing, fuelwood gathering, logging, Christmas tree harvesting, piñon picking, medicinal plant collection, hunting, fishing, agriculture, and mining. Many of the communities within and adjacent to the forest occupy a small land base and have limited opportunities for growth with respect to community facilities and uses (e.g., cemeteries, dumps, domestic water, wastewater, and community centers). Acknowledging the importance of these activities and concerns to area families and communities is crucial for understanding their way of life and resolving disputes over public land and resource use. The use of the Santa Fe NF provides opportunities for community interaction and maintenance of traditional culture.

While the Santa Fe NF is considered a community forest, many smaller communities call the forest home, and rely upon its many resources and uses. Some people may identify themselves from Truchas, as a rancher, a member of a land grant, an acequia parciante, or possibly all of these. Regardless, what they have in common is a strong cultural and social tie to the lands in and around the Santa Fe NF. The two communities identified below are recognized by the State as governing bodies.

Land Grants-Mercedes

From 1689 to 1846, Spain and later Mexico made land grants or ‘mercedes’ to individuals, groups, and towns to promote development in the frontier lands that today constitute the American Southwest. The two most common types of Spanish and Mexican land grants-mercedes made in New Mexico were “community land grants” and “individual land grants.” Community land grants were typically organized around a central plaza, whereby each settler received an individual allotment for a household and a tract of land to farm, and “common land” was set aside as part of the grant for use by the entire community. Individual land grants, as its name suggests, were made in the name of specific individuals. Today, many land grants-mercedes are organized as political subdivisions of the State of New Mexico (New Mexico Statutes Annotated 1978 §§49-1-1 to 49-1-23). Those that are not political subdivisions participate through the New Mexico Land Grant Council, which is a State agency that represents the interest of all New Mexican land grants-mercedes.

Many traditional Hispanic communities have ties to lands in the Santa Fe NF that were once common lands of community land grants-mercedes. The national forest maintains relationships with several Spanish- and Mexican-era land grant-merced communities including former common lands now administered by the Forest Service. Common lands provided land grant-merced communities access to grazing land, water for agriculture and consumption, stone and clay, wood, game, fish, medicinal plants, and other forest products (uses that continue today), and with areas which were made sacred (e.g., cemeteries, moradas, churches, and pilgrimage sites). Many land

grants-mercedes are actively involved in managing and preserving adjacent NFS lands for traditional and cultural use. Some have boards of trustees to fulfill this mission through a variety of activities, including managing, protecting, and regulating uses of common lands; preserving cultural and historic resources; and partnering with the Forest Service to plan and propose forest restoration projects on NFS lands.

Acequias

Acequias are community operated and organized water irrigation systems. Many of the State's acequia associations have been in existence since the Spanish Colonial period in the 17th and 18th centuries and were historically associated with land grants-mercedes. Acequia and community ditch associations are political subdivisions of the State of New Mexico and occupy a unique place in forest management (New Mexico Statutes Annotated 1978 §73-2-28). Acequias that existed on unreserved public lands for use in connection with a valid water right, prior to the withdrawal of public lands to create the national forests, are afforded valid rights and status under NFS management, including the right codified in Federal law (R.S. 2339).

Much of the water diverted by acequias comes off of NFS lands and can be affected by forest management activities upstream. On July 2, 2019, the U.S. Forest Service Southwestern Region issued an Acequia Guidance Document acknowledging these rights and providing a "clear framework for efficient and effective administrative determinations concerning proposals for the maintenance, operation, access to, construction and reconstruction of acequia infrastructure on NFS lands." Acequias are still relevant and vital to water delivery and community organizing systems today. They modify the hydrology and riparian distribution across irrigated floodplain valleys, recharging groundwater and delaying return flow to streams. They serve as important water infrastructure for communities, and their associations are important community organizations throughout New Mexico.

Desired Conditions for Rural Historic Communities **(FW-RURALH-DC)**

1 The uniqueness and values of rural historic communities are recognized and valued; the traditional uses important for maintaining these cultures are supported and contribute to the social and economic sustainability of local communities.

2 The long history and ties of rural historic communities and traditional uses (e.g., livestock grazing, fuelwood gathering, acequias, and hunting) to NFS lands and resources is understood and appreciated.

3 Forest resources important for cultural and traditional needs (e.g., osha, piñon nuts, okote (pitch wood), and micaceous clay) as well as for subsistence practices and economic support (e.g., livestock grazing, acequias, firewood, vigas, latillas, gravel, soils, and forest products) of rural historic communities are available and sustainable.

4 Rural historic communities have access to places of traditional use (e.g., spiritual places, individual and group ceremonies, traditional activities, and the collection of forest products) that are important to them.

5 Acequia systems on NFS lands are accessible for operation, maintenance, repair, and improvement.

6 The forest provides a setting for educating youth in culture, history, and land stewardship, and for exchanging information between elders and youth.

Guidelines for Rural Historic Communities **(FW-RURALH-G)**

1 Traditionally used products (e.g., fuelwood, latillas, vigas, piñon, osha, and clay) should be available in the forest to rural historic communities, except in areas with resource concerns or in designated areas where such uses are not allowed, or otherwise restricted by standards or guidelines set forth in other sections of this plan.

2 Management activities should be analyzed and mitigated to prevent or minimize the negative impacts to the physical and scenic integrity of places that rural historic communities regard as spiritually or culturally important.

3 Acequia associations should be provided adequate access to operate, repair, maintain, and improve acequia infrastructure located on NFS lands.

4 Coordination with land grants and acequia governing bodies should occur at the early stages of planning and project design to include local perspectives, needs, concerns, and traditional knowledge.

Management Approaches for Rural Historic Communities **(FW-RURALH-MA)**

1. Work with traditional communities and governing bodies for land grants and acequias to understand their needs and build respectful, collaborative relationships; develop collaborative proposals and implement projects of mutual benefit across shared boundaries and with shared infrastructure (e.g., boundary fences or roads); develop ways of accomplishing mutually desired conditions and objectives; and collaborate in ecosystem restoration efforts.
2. Cooperatively develop interpretive and educational exhibits that focus on the history of the lands managed by the Santa Fe NF in collaboration with rural historic communities to provide the public with a greater understanding and appreciation of our shared history, culture, and traditions.
3. Consider identifying forest locations that can provide a setting for educating youth in culture, history, land stewardship, and the health benefits of outdoor activities (e.g., through cooperation with cultural youth programs such as the Youth Conservation/Preservation Corps or others).
4. Consider acknowledging locations identified as important by rural historic communities and managing them with an emphasis on the resilience and protection of natural and cultural resources.
5. Consider providing training for forest employees to foster an understanding of the unique customs, traditions, and values of rural historic communities.
6. Coordinate with rural historic communities and governing bodies for land grants and acequias to develop collaborative proposals and implement projects of mutual benefit across shared boundaries.
7. Consider developing approaches for rural historic communities to continue to practice occupational- and subsistence-based activities that are sensitive to environmental and cultural concerns.
8. Work with rural historic communities to identify areas where motorized and non-motorized access to resources important to cultural and traditional needs are vital.

9. Consider incorporating Spanish language interpretive materials to highlight the Hispanic culture as part of the landscape of the forest and its surrounding areas.
10. Consider ways to make fuelwood permits available locally in the field where the fuelwood is available or allow rural communities to get a fuelwood permit at the Forest Service district office closest to them or at another government office, rather than only at the district office administering the permitted area.
11. Consider referencing the New Mexico Acequia Guidance document for clarification of authorities and responsibilities related to acequia management and governing body coordination.

Cultural Resources and Archeology

"No other place in the United States has a continuity of occupation equal to that surrounding the Santa Fe NF. Evidence of stable occupation can be found dating back at least 1,000 years."

(Mike Bremer, Retired Forest Archaeologist for the Santa Fe National Forest)

Cultural and historic resources refer to the tangible evidence of past human occupation and behavior on the forest. These may consist of archaeological sites, traditional cultural properties, historic buildings and structures, cultural landscapes, and districts composed of multiple historic features. Human use and occupation began in the area over 10,000 years ago. Native Americans (American Indians) ancestral to the ethnic affiliations of the contemporary Pueblo and Athabaskan people have inhabited or utilized forest resources over much of this time. Euro-Americans and other people from the Old World began to occupy the area in the 16th and 17th centuries. Recent history includes the last hundred years that the Santa Fe NF has been under the management of the Forest Service.

There are many cultural and historic resources on the Santa Fe NF that are significant to local communities, the State of New Mexico, the Southwestern region, and the United States. There are regions of archaeological importance associated with ancestral development of American Indian communities such as the Jemez Mesas, the Pajarito Plateau, the Rio Chama, and the Gallina region. In addition, many of these areas of archaeological significance have tribal importance to local American Indian Tribes. Several of these have interpretive sites being managed as cultural interpretive management areas (see chapter 4). Numerous sites have been listed on the National Register of Historic Places, including Ancestral Pueblo communities on the Jemez Mesas and Pajarito Plateau, historic logging railroad sites on the Jemez Mesas, Archaic sites in the Rio Chama area, and historic segments of the Camino Real del Tierra Adentro and Route 66. Many of these historic properties are also areas of tribal importance.

Cultural and historic resources are non-renewable and, depending on the nature of the resource, can be particularly sensitive to management practices, and natural and human-induced environmental degradation. The forest is mandated by the National Historic Preservation Act of 1966 to evaluate effects of its activities on historic properties (defined as being more than 50 years in age) and listed or eligible for listing on the National Register of Historic Places. Additionally, many sites not listed on the national register have been determined to be eligible and are managed as if they were listed. Some sites, although not eligible for the national register, are important to local communities. Some locations do not meet the definition of a historic property, but are nonetheless important for preserving traditional values within a community.

The Santa Fe NF maintains an active program of site stewardship and public archaeology that contributes to overall site preservation and disseminates valuable interpretive information in response to the public's interest in cultural and historic resources. The forest also maintains an active tribal consultation program on the disposition and treatment of sites and materials of interest to local American Indian communities.

Cultural and historic resources offer cultural ecosystem services as an intrinsic component of their historical nature. Historic sites support today's traditional practices as well as providing ancestral ties to the land. The wealth of sites provides benefits for education and research that promotes understanding of human adaptation over such a long period of history. Interpretive heritage tourism, while relatively new, can also provide new economic benefits from these sites and their

research. Finally, cultural traditions and long-standing connections with ecosystem functions offer forest management a diversity of perspectives to engage in problem-solving.

Desired Conditions for Cultural and Historic Resources **(FW-ARCH-DC)**

1 Cultural and historic resources (including archaeological sites, historic buildings and structures, traditional cultural properties) are stable and are maintained in a manner that does not adversely affect their integrity, including:
   a Visual and aesthetic integrity and physical association with culturally significant landscapes
   b Surrounding landscapes that are resilient to natural ecological processes
   c Long-term stability with other forest uses and the absence of vandalism, looting, or other human impacts
   d Dual roles with administrative, recreational, or infrastructure facilities.

2 The public has opportunities for learning about, appreciating, and understanding cultural and historic resources as well as resources significant to traditional communities. Public understanding about the past occupation, historical and current uses, and use of landscapes and cultural resources contributes to their protection.

3 The public—including members of descendant communities—has opportunities to participate in the identification, stewardship and protection, and preservation of cultural and historic resources.

4 Heritage tourism opportunities are available for the public.

5 Public users of historic recreation facilities and historic infrastructure learn about and enjoy their historic qualities.

6 Historic recreation residences and residence tracts maintain their historic integrity.

Standards for Cultural and Historic Resources **(FW-ARCH-S)**

1 Cultural and historic resources must be protected during projects through mitigation measures and design features. In cases where the protection of cultural and historic resources is not possible or when the benefits of a project are deemed by administrative decision to be greater than the adverse effects to the cultural and historic resources, adverse effects to those resources will be resolved or mitigated.

2 For historic or contributing recreation residences,[11] the operation and maintenance plan for the special-use authorization must stipulate that the maintenance and upkeep maintain historic characteristics of the residence lot.

3 Contracts, permits, or leases that have the potential to affect cultural and historic resources must include appropriate clauses specifying site-protection responsibilities and liabilities for damage.

[11] Defined as those eligible for listing on the National Register of Historic places as individual properties or as properties that contribute to a larger historic district (the tract).

Guidelines for Cultural and Historic Resources **(FW-ARCH-G)**

1 Descendent communities should be involved in the early stages of project planning and design, including the identification of cultural and historic properties, assessment of their significance, and development of mitigations for protecting these resources.

2 Cultural artifacts should be preserved in their original place, except where necessary to prevent their imminent loss. Artifacts should be curated as soon as practicable after collection.

3 When human remains and objects of cultural patrimony as defined under the NAGPRA[12] are encountered during cultural resource investigations, affiliated communities should be notified, and appropriate steps should be taken for repatriation.

4 Historic documents (e.g., photographs and maps) should be properly preserved and made available for research and interpretation by the Forest Service, contractors, other agencies, universities, American Indian Tribes, historic Spanish/Mexican rural communities, and the public.

Management Approaches for Cultural and Historic Resources **(FW-ARCH-MA)**

1. Consider maximizing opportunities for partnerships and volunteerism with the heritage program. Cooperate with local, State, and Federal agencies, as well as institutions and local federally recognized tribes in accomplishing program goals and objectives.
2. Collaborate with federally recognized tribes and other traditional communities to manage historic sites and other traditional areas of importance.
3. Collaborate with federally recognized tribes and other traditional communities to identify mitigation measures for historic properties, traditional cultural properties, and cultural landscapes during management activities.
4. Work with partners such as the federally recognized tribes, Youth Conservation/Preservation Corps, land grants, acequias, New Mexico Historic Preservation Division SiteWatch program, Archaeological Society of New Mexico, the National Park Service, and local museums to identify, study, protect, and monitor sites and artifact collections.
5. Consider measures to improve relationships with federally recognized tribes and other traditional communities.
6. Consider drafting new and updating existing memoranda of understanding with federally recognized tribes as needed.
7. Consider using heritage programs, interpretive presentations, publications, and interactive learning opportunities to provide the public with opportunities to learn about, understand, and experience the forest's prehistory and history.
8. Consider using programs (e.g., Youth Conservation/Preservation Corps, site stewards, volunteers, and Passport in Time) that engage the public to assist in protecting, managing, and documenting cultural resources.
9. Consider updating the Forest Overview and Cultural Resources Planning Assessment into a comprehensive document to include a synthesis of known cultural data as well as lists of

[12] Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (35 U.S.C. 3001).

priorities for non-project survey, national register nominations, site stabilization, interpretation, and public involvement.

10. Consider restoring select historic structures for appropriate recreation or interpretive use.
11. When mitigating resource deterioration, consider implementing the following protective measures: vegetation treatment in and adjacent to site boundaries (provided appropriate protection measures are in place), signing, fencing, administrative closure, patrols, interpretive signs, stabilization, or data recovery.
12. Prioritize non-project-related surveys as follows: (1) areas where historic properties are threatened or ongoing impacts are unknown and need to be assessed; (2) areas indicated to have high cultural value or high density of cultural resources; (3) areas of importance to traditional communities; and (4) areas where additional survey will contribute to a greater understanding of the prehistory or history.

Forest Products

"Wood harvested from the SFNF is used for heating in the winter, providing substantial relief to budget-stressed households."

(Public comment on the Notice of Intent, summer 2016)

"gathering wood from the lowlands where pinon and juniper to the high lands for pine and sugar pine. Herbs are gathered here from yerba del perda, yerba de la colebra, wild small strawberries, chamisso heyondo, oregano, and piñon gathering."

(Public comment for Wilderness Evaluation, fall 2016)

Common forest products available from the Santa Fe NF include sawlogs, fuelwood, latillas, vigas, posts, poles, and piñon nuts. Sawlogs and fuelwood can additionally be available as byproducts of forest restoration or forest fuels reduction projects. Other forest products include moss rocks, gravel, wildlings (aspen or piñon seedlings), Christmas trees and boughs, mushrooms, floral greenery, medicinal plants, cones, sap, berries, and decorative wood; some of which require permits to collect.

NFS lands were reserved with the intent of providing goods, including production of a sustainable supply of forest products and services to satisfy public needs over the long term. Over the last 15 to 20 years, the Forest Service emphasis has broadened, and current land management is more focused on providing ecological health and ecosystem services. Timber volume outputs are derived based upon desired conditions and restoration objectives. Timber production activities are considered tools that economically contribute to restoring and maintaining ecosystem diversity and supporting a viable wood products processing industry. To achieve this, the focus has shifted toward supporting ecological restoration and reduction of wildfire hazard to communities through the removal of small-diameter, insect-infested, and dead and dying trees. Markets will need to make use of these types of forest products resulting from restoration treatments.

In northern New Mexico access to wood products continues to be an important component of the local social and economic fabric. Fuelwood harvest in particular is regarded as a traditional family activity and the Santa Fe NF is a major source of fuelwood for the many local residents who still rely on wood to heat their homes during the winter months. The forest is also a major source of vigas (heavy logs that support a roof) and latillas (peeled pieces of wood laid between vigas), which are essential in building and renovating pueblo-style and territorial-style adobe homes that are characteristic of the architecture in northern New Mexico.

The most obvious ecosystem service of forest products includes provisioning ecosystem services from timber. This commonly included sawlogs in the 1970s and 1980s, a practice that continues today by extracting sawtimber from the forest for lumber production. Extracted timber is also commonly used for fuelwood and miscellaneous products such as posts and poles, vigas and latillas; Christmas trees; and transplant stock. These products are also cultural ecosystem services as discussed above. Ponderosa pine and mixed conifer forests where fire has been absent commonly have dense thickets of small-diameter woody growth. Timber harvest is an important step in restoring these areas to their desired conditions, which improves regulating ecosystem services. Thinning timber to create more space between trees allows grasses to grow, improves water retention and nutrient cycling, and mitigates the risk of uncharacteristic wildfire. When frequent-fire forests are managed to mitigate the chance of uncharacteristic wildfire, carbon stability increases (Hurteau 2017, Krofcheck et al. 2019). By staging different vegetation treatments across

the landscape, there are a greater variety of habitats for wildlife, which is a supporting ecosystem service.

Timber Suitability

The National Forest Management Act of 1976 requires that NFS lands be classified as to their suitability for timber production. NFS lands were reserved with the intent of providing goods and services to satisfy public needs over the long term, among them is a sustainable supply of forest products. The 2012 Planning Rule provisions require the responsible official to identify lands not suitable for timber production within the area governed by the forest plan (36 CFR 219.11).

Forest Service Manual (FSM) 1900 defines "forest land" as that which has at least 10 percent tree cover, or which had such tree cover in the past, and which is not currently developed for non-forest uses, such as agriculture, providing improved pasture, residential or administrative areas, improved roads of any width, and adjoining road clearing and powerline clearing of any width. It defines timber production as "the purposeful growing, tending, harvesting, and regeneration of regulated crops of trees for cutting into logs, bolts, or other round sections for industrial or consumer use."

Forest land may be considered as unsuited for timber production if any of the following apply:

1. Congress, the Secretary of Agriculture, or the Chief of the Forest Service has withdrawn it from the public domain;
2. it is not producing or capable of producing crops of industrial wood;
3. there is no technology available to prevent irreversible damage to soil productivity and/or watershed conditions;
4. there is no reasonable assurance based on existing technology and knowledge, that it is possible to restock lands within five years after final harvest, as reflected in current research and experience;
5. there is currently a lack of adequate information about responses to timber management activities; and/or
6. timber management is inconsistent with, or not cost-efficient in meeting, the management requirements, and multiple-use objectives specified in the forest plan.

Table 2. Classification of lands suitable for timber production on the Santa Fe NF

Land Classification Category	Acres
A. Total NFS lands in the plan area	1,545,310
B. Lands not suited for timber production due to legal or technical reasons	1,187,958
C. Lands that ***may* be suited** for timber production (A–B)[13]	356,943
D. Total lands **suited** for timber production because timber production is compatible with the desired conditions and objectives established by the plan	356,716
E. Lands not suited for timber production because timber production is not compatible with the desired conditions and objectives established by the plan (C–D)	227
F. Total lands **not suited** for timber production (B+E)	1,187,942

[13] Will not equal the total acres of Santa Fe NF administered land (A) minus lands not suited for timber production (B) because of gaps between datasets and the forest boundary that can be up to 500 acres.

Table 2 shows the results of a timber suitability analysis for the Santa Fe NF. In the table, various categories of forest land are described, and the acres suitable for timber production are reported.

The timber suitability analysis created the foundation to determine the amounts of timber and forest products anticipated to be harvested from the Santa Fe NF over the lifetime of the forest plan. These quantitative measures include sustained yield limit (SYL), which is the quantity of wood products that could be removed from the forest in perpetuity; projected wood sale quantity (PWSQ), which is all woody material likely to be sold from forest harvests whether or not the woody material meets utilization standards; and projected timber sale quantity (PTSQ), which is a subset of the projected wood sale quantity, and is an estimate of the quantity of timber expected to be sold during the plan period. The following measures are estimated values for the first decade of the forest plan in the Santa Fe NF:

SYL	PTSQ	PWSQ
70.6 MMCF (303.4 MMBF)	43.6 MMCF (145.8 MMBF)	52.7 MMCF (163.4 MMBF)

A detailed process document for determining timber suitability, SYL, PTSQ, PWSQ, and maps of suitable timber lands are located in the FEIS Volume 2, Appendix C: Timber Suitability and Forest Products Analyses Processes.

Desired Conditions for Forest Products **(FW-FORESTRY-DC)**

1 Forest products (e.g., fuelwood, latillas, vigas, Christmas trees, herbs, medicinal plants, and piñon nuts) are available to businesses and individuals in a sustainable manner (e.g., forest products recover between collections) that also effectively contributes to watershed health and the restoration or maintenance of desired vegetation conditions.

2 Forest products are available for traditional communities and culturally important activities and contribute to social and economic sustainability of local communities.

3 Forest products that are a byproduct of management activities are available for personal use (e.g., fuelwood) by the public.

4 Non-commercial and commercial timber harvest supplement restoration and maintenance treatments at a scale that achieves landscape desired conditions and contribute to watershed restoration function and resilience, wildlife habitat enhancement, small and large business and employment opportunities, and provide wood products.

5 Harvest of dead and dying trees for economic value is consistent with the desired conditions of wildlife habitat, soil productivity, and ecosystem functions.

6 Unauthorized collection (e.g., unpermitted removal or collection outside of permitted areas) of permitted forest products is uncommon.

Objective for Forest Products **(FW-FORESTRY-O)**

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

Standards for Forest Products **(FW-FORESTRY-S)**

1 Regulated timber harvest (tree harvest for the purposes of timber production) must occur only on lands classified as suitable for timber production (16 U.S.C. 1604).

   a On lands suitable for timber production, timber harvest intended to create openings for tree regeneration must only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest.

   b Timber harvest would occur only where soil, slope, or watershed conditions would not be irreversibly damaged.

   c Timber will be harvested only where protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water.

   d Timber harvest will be carried out consistent with the protection of soil, watershed, fish, wildlife, traditional use resources, cultural and historic resources, recreation, and aesthetic resources.

   e Timber will be harvested only where the harvesting system is not selected primarily because it will give the greatest dollar return or unit output of timber.

2 Harvests to meet resource objectives other than timber production (e.g., fuelwood harvest, protection, and habitat enhancement) are permitted on all lands (i.e., suitable and not suitable).

3 The sale of timber from the national forest shall be limited to a quantity equal to or less than a quantity that can be removed from the forest annually in perpetuity on a sustained-yield basis and exceptions (departures, decade, salvage and sanitation harvests).

4 Even-aged regeneration cuts (e.g., clearcutting, seed tree cutting, etc.) during one harvest operation must not exceed 40 acres, unless requirements of both a and b and either c or d as listed below are met.

   a interdisciplinary team analysis determines clear cuts to be appropriate and the optimum method, and

   b a 60-day public notice and review by the Regional Forester occurs, and

   c it is necessary to achieve the ecological desired conditions in this plan, or

   d harvest is the result of natural catastrophic conditions (e.g., stand-replacing fire, windstorm, or insect or disease outbreak)

5 Even-aged regeneration cuts must be shaped and blended with the natural terrain.

6 Harvesting systems (methods) must primarily be selected for their effectiveness to move toward ecological desired conditions.

Guidelines for Forest Products **(FW-FORESTRY-G)**

1 On suitable timberlands, regeneration harvest of even-aged stands should have reached or surpassed 95 percent of the culmination of mean annual increment, unless it is needed to:

   a Reduce fire hazard within the wildland-urban interface (WUI),

   b Contribute toward achieving the desired uneven-aged vegetation conditions over the long term, or

   c Treats unsustainable stand conditions resulting from insects, disease, or other damage agents.

2 Log landing areas should be located outside of mapped sensitive areas (e.g., riparian management zones, wetlands, archeological sites, threatened and endangered critical habitat, and along Scenery Management System Concern Level I Routes). When landings must be located in these areas, effects to the sensitive resource will be mitigated.

3 Management activities should use information from the best available science to reduce the likelihood of uncharacteristic insect and disease outbreaks (per Guideline 4 in Wildlife: Nonnative and Invasive Species).

Management Approaches for Forest Products **(FW-FORESTRY-MA)**

1. When planning and implementing projects, work collaboratively with Federal, State, local governments, federally recognized tribes, industry, environmental groups and private landowners to promote integrated ecological and social-economic goals of harvesting forest products to support a sustainable and appropriately scaled industry.
2. Consider developing and promoting public education (e.g., brochures, signs, websites, and social media) on the ecological and social impacts of illegal activities and the importance of the sustainability of these resources.
3. Consider designing variably sized timber contracts to accommodate a range of operations based in northern New Mexico communities.
4. During the planning process, consider uneven- or even-aged timber harvest methods that reflect the scale of natural disturbances and are designed to achieve desired conditions (e.g., size class distribution, species composition, patch size, fuel reduction, insects and disease).
5. In addition to treatments in highly departed frequent fire ERUs (e.g., PPF, MCD), consider treatments within infrequent-fire ERUs (e.g., spruce-fir forest, mixed conifer with aspen, and piñon-juniper woodland) for ecological and socioeconomic benefits.
6. Consider designating and managing stands of mature or over-mature piñon for the gathering of piñon nuts and potentially restrict the harvest of firewood in these stands.
7. Consider using woody material that results from management activities prior to on-site burning and chipping.
8. Consider making fuelwood available through public access within a project area, providing some decked woody material along roads, or allowing collection within utility corridors being thinned.

9. Consider preparing pest control plans with forest health specialists that contain appropriate mitigation measures (e.g., use of resistant tree species, maintenance of species diversity, removal of damaged trees, and pesticides) and monitoring procedures. Monitoring procedures might include:
    a. Measure effectiveness of treated areas;
    b. Determine effects on non-target organisms;
    c. Determine effects on water quality; or
    d. Determine effects of pesticide that enters the soil or air.

Sustainable Rangelands and Livestock Grazing

"We use it for our way of life – ranching…Our boys have grown up in ranching life."

(Public comment during Assessment, spring 2014)

"Many rural families supplement their monetary or nutritional needs by raising livestock for a portion of the year on the Santa Fe NF."

(Public comment on the Notice of Intent, summer 2016)

Rangelands are grasslands, shrublands, woodlands, wetlands, and deserts that are grazed by domestic livestock or wild animals. On the Santa Fe NF, most of the land is grazed by ungulates unless it is too steep or designated for special use, such as the Santa Fe watershed.

There is a long history of ranching and farming in the area prior to the establishment of the Santa Fe NF. "The ranching tradition in northern New Mexico is long standing, enduring across many generations. Livestock ownership and ranch life are powerful forces that bind families and communities, continuing a heritage that began with Spanish colonization. Owing to the history of land use and ownership in the region, many contemporary ranchers rely to a considerable degree on public land to graze their animals" (Raish and McSweeney 2003). The forest was initially grazed by cattle, sheep, swine, and goats. Today, it is grazed by cows, calves, and yearlings, with incidental use by permittees' working horses. Much of this land was formerly granted to or used by traditional communities and the ancestors of current permit holders.

Ranching and livestock grazing continue to be traditional cultural values in the rural communities adjacent to the Santa Fe NF. McSweeney and Raish (2012) summarized livestock grazing of northern New Mexico: "Retaining the livestock operation for family and future generations is a goal common to the permittees." The traditional value of ranching is so important that even when it is not economically viable to rely on their grazing operation, ranchers work other jobs as a means of supplementing their income. A working ranch lifestyle, even in limited scale, carries tangible family and cultural benefits; Santa Fe NF permits are typically small, with herd size ranging from 1 to 374, and an average herd size per permit of only 39. Some families have made conscious employment choices to remain in the local community. In spite of the difficulties, they expressed hope for the future of the ranch, the land, and the family. Most permittees consider their ranching and livestock operations as an investment or a form of savings. "While the ranch may produce little or even a negative operating income, the assets have a high value which is expected to increase. Most northern ranchers own their homes, land and cattle, and these constitute a significant investment and form of savings, which often has a very high value." Due to the history of land ownership and land grants, many of these operations may not be viable if unable to use public lands. (McSweeney and Raish 2012)

The numbers of grazing permits, grazing allotments, and maximum permitted forage consumption (animal unit months [AUMs]) on the Santa Fe NF have steadily increased over the past 20 years. Livestock management on NFS lands has shifted to an adaptive management philosophy allowing appropriate seasonal changes in livestock numbers (increases or decreases) or seasons of use, in response to changing ecological conditions (e.g., forage production, water availability, and precipitation patterns). Adaptive management recognizes that our knowledge about natural systems can be uncertain (e.g., climate variability, fire, or flooding), and future management needs to be flexible to adjust to meet the management objectives. When used appropriately, this flexibility better mimics natural processes and decreases the potential for undesired impacts on

other resources. This adaptive management strategy is codified as policy in the Forest Service Handbook on Grazing Permit Administration and Rangeland Decision Making. When monitoring indicates that adjustments are needed, the adaptive management approach allows for changes to occur as long as they remain within the range analyzed in the NEPA analysis that authorized grazing for that allotment.

Sustainable rangelands play an essential role in providing ecosystem services. Rangelands, as working landscapes, sustain beef cattle ranching while providing habitat for wildlife, recreation, and open space amenities, as well as spiritual and cultural values that define a way of life (Maher et al. 2021). Continuing this way of life on ancestral lands enhances the culture and heritage for future generations, making cultural ecosystem services one of the most prominent services provided by rangelands on the Santa Fe National Forest. Many people living in traditional communities participate in or have connections to ranching and identify with the associated values. Forage provided by rangelands supports livestock grazing and provides provisioning ecosystem services which contribute to the livelihood of permit holders and to the economy of traditional communities and counties. These livestock grazing opportunities contribute to the economic viability of local ranches which helps to conserve open space by keeping the private lands in agricultural production and avoiding exurban development (Bradford, et al. 2002; Brown and McDonald 1995; Resnik et al. 2006; USDA Forest Service 2007).

Proper livestock grazing can serve as a management tool (not just a use) and can provide ecological benefits. By viewing herbivory (grazing) as a tool to achieve a desired, clearly enunciated result, managed grazing can be used to achieve multiple purposes (Budd and Thorpe, 2009). Well managed livestock grazing can aid in maintaining and/or improving rangeland health through such things as invasive plant control, reduction of fine fuels and improved heterogeneity of vegetation across the landscape (Derner et al. 2009; Adler et al. 2001; Strand et al. 2014). Maintaining and/or improving the health and resiliency of rangelands facilitates their ability to provide supporting ecosystem services such as nutrient cycling and regulating ecosystem services such long-term storage of carbon (Havstad et al. 2007; Teague and Kreuter, 2020; Yahdjian et al. 2015).

Desired Conditions for Sustainable Rangelands and Livestock Grazing **(FW-RANGE-DC)**

1 Sustainable rangeland forage provides livestock grazing opportunities that contribute to agricultural business and local employment, as well as traditional and generational ties to the land.

2 Livestock grazing contributes to the social and economic sustainability of local communities.

3 Rangelands are resilient to disturbances and variations in the natural environment (e.g., fire, flood, and climate variability).

4 Livestock grazing is compatible with ecological function and processes (e.g., water infiltration, wildlife habitat, soil stability, and natural fire regimes).

5 Native plant communities support diverse age classes of shrubs and vigorous, diverse, self-sustaining understories of grasses and forbs relative to site potential, while providing forage for livestock and wildlife.

6 Wetland and riparian areas within active allotments consist of native obligate wetland species and a diversity of riparian plant communities consistent with site potential and relative to wetland riparian and forest, shrub, and scrub riparian desired conditions.

7 Range infrastructure functions to maintain or improve livestock grazing management and the condition of forest ecological and cultural resources.

Objectives for Sustainable Rangelands and Livestock Grazing **(FW-RANGE-O)**

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

2 Maintain, improve, or install at least one water feature per year to improve water availability for wildlife or livestock where natural water sources are limited.[14]

[14] These water features can serve dual purposes for both wildlife and livestock and can be done in conjunction with objective for water features in wildlife section.

Standards for Sustainable Rangelands and Livestock Grazing **(FW-RANGE-S)**

1 Livestock management must be compatible with capacity and address ecological resources (e.g., forage, invasive plants, at-risk species, soils, riparian health, and water quality) that are departed from desired conditions, as determined by temporally and spatially appropriate data.[15]

2 New or reconstructed fencing must allow for wildlife passage, except where specifically intended to exclude wildlife (such as elk exclosure fence) or to protect human health and safety, while maintaining its effectiveness for livestock management.

3 New and reconstructed range improvements must be designed to prevent wildlife entrapment and provide safe egress for wildlife (e.g., escape ramps in water troughs and cattle guards).

Guidelines for Sustainable Rangelands and Livestock Grazing **(FW-RANGE-G)**

1 Forage use should be based on current and desired ecological conditions as determined by temporally and spatially appropriate scientific data during planning cycles (e.g., Annual Operating Instructions or permit renewal), to sustain livestock grazing and maintain ecological function and processes.[16]

2 Livestock grazing within riparian management zones (RMZ) should be managed to sustain proper[17] stream channel morphology, floodplain function, and riparian vegetation desired conditions.

3 New livestock troughs, tanks, and holding facilities should be located to avoid long-term detrimental impacts to RMZs unless necessary for resource enhancement or protection.

4 New range infrastructure (e.g., troughs or tanks) should be designed to avoid long-term negative impacts to soil resources (e.g., soil compaction and soil loss) to maintain hydrological function outside of the structure's footprint.

5 Salting or mineral supplementation should not occur on or adjacent to areas especially sensitive to salt and increased ungulate traffic (e.g., riparian areas, wetlands, archeological sites, and at-risk species present) to protect these sites.

6 Restocking decisions and management of grazing allotments following a major disturbance (e.g., wildfire) should occur on a case-by-case basis after consideration of site-specific resource conditions.

[15] Guidance can be found in the Grazing Permit Administration Handbook, Regional Supplements, and best available science. Guidance for cooperating with permittees when establishing capacity can be found in the most current Grazing Permit Administration Handbook (2209.13_90).

[16] Guidance can be found in the Grazing Permit Administration Handbook, Regional Supplements, and best available science. Guidance for cooperating with permittees when monitoring can be found in the most current Grazing Permit Administration Handbook (2209.13_90).

[17] Proper stream channel morphology and floodplain function as defined by BLM's proper functioning condition protocol, or a similar metric.

7 Vacant or understocked allotments should be made available to permitted livestock for pasture during times or events when other active allotments are unavailable and require ecosystem recovery as a result of natural disturbances (e.g., wildfire) or management activities (e.g., vegetation restoration treatments).

8 Grazing of domestic sheep or goats should not be authorized in areas occupied by bighorn sheep to minimize the spread of disease between domestic and wild populations.

Management Approaches for Sustainable Rangelands and Livestock Grazing **(FW-RANGE-MA)**

1. Forest managers cooperate, collaborate, and coordinate with permit holders to respond to changing resource conditions. Cooperation, collaboration, and coordination among Santa Fe NF and permit holders is key to improving rangeland and forest conditions for multiple uses, moving toward desired conditions, and contributing to the socio-economic wellbeing of local communities. In addition, collaboration among stakeholders is important, including local communities; permit holders; and Federal, State, county, and local government entities.
2. Develop partnerships with livestock grazing permit holders, agencies (e.g., the NMDGF), and other groups and individuals to develop collaborative proposals and implement projects that benefit multiple use on the forest.
3. Coordination with livestock grazing permit holders should occur at the early stages of planning and project design to include local perspectives, needs, concerns, and traditional knowledge.
4. When livestock grazing is modified as a response to changing resource conditions and permit holder needs, forest managers should first consider adjusting timing (which is easier for the permit holder), followed by intensity and frequency. Consider adjusting intensity at permit renewal. In addition, collaboration among stakeholders is important including the local interdisciplinary team; permit holders; Federal, State, county and local government entities; and non-governmental organizations.
5. Acknowledge the economic, traditional, and cultural importance of livestock grazing to northern New Mexico families and consider providing Forest Service employees education on the importance of this traditional practice.
6. Consider emphasizing large-scale landscape approaches and treatments for restoring rangelands and the use and perpetuation of a diversity of native plant species, with an emphasis on grass, forb, and shrub communities.
7. Consider using an adaptive management strategy to manage livestock grazing in a manner that promotes ecosystem resiliency, sustainability, and species diversity, based on changes in range conditions, climate, and other resource conditions. Using the adaptive management strategy provides more flexibility to grazing management, while improving or maintaining rangeland health.
8. Consider inviting association members and individual permit holders on range inspections.
9. Consider modifying, relocating, or removing existing range facilities in water resource features, where their presence is determined to inhibit movement toward desired riparian or aquatic conditions and consistent with existing water rights and water quality and quantity.
10. Consider how ungulates (e.g., elk, deer, and livestock) have cumulative impacts on Forest resources.

11. Where an allotment fence intersects a designated trail, consider using a self-closing gate (e.g., easy-to-use gate, walk-through gate, or horseback accessible) to provide access for recreation users that does not risk livestock escape.
12. In wetland or riparian areas that are functional-at-risk or non-functional, consider avoiding livestock grazing in the same area during the same vegetative growth and reproduction periods (e.g., leafing, flowering, or seeding) in consecutive years to ensure that riparian pastures have vegetative recovery.
13. Consider grazing aspen groves early in the season and resting in the fall, and doing a rest rotation every 2 consecutive years out of every 5 years.

Recreation

"I like to use the forest in many ways. In the winter I ski and snowshoe. In the summer, spring, and winter I like to mountain bike, hike, picnic, and improve the area through trail building."

(Public comment during the Assessment, spring 2014)

National forests of the United States provide a diversity of outdoor recreation opportunities, connecting people with nature in an unmatched variety of settings and activities. Participation in recreational activities provides an important understanding of the meaning, history, and relevance of public lands, as a whole. Recreation contributes greatly to the physical, mental, and spiritual health of individuals; bonds family and friends; instills pride in heritage; and provides economic benefits to communities, regions, and the Nation. Santa Fe NF recreation resources and opportunities, as defined in this plan, include: (1) activities associated with developed recreation sites, (2) dispersed recreation activities, and (3) recreation special uses.

Use of the Santa Fe NF for recreation dates back through the past century. The first permitted summer homes were constructed in the forest in 1917, in Holy Ghost Canyon. In the 1920s, fishing and big game hunting became activities more of leisure rather than subsistence. During World War II, scientists at Los Alamos popularized skiing, horseback riding, and hiking. Ski Santa Fe, the only commercial downhill ski area in the Santa Fe NF, was founded in 1947. Today, approximately 1.3 million people visit the forest annually, and their primary reason for visiting is recreation. The most popular[18] activities for visitors include hiking and walking, viewing natural features, viewing wildlife, relaxing, driving for pleasure, nature study, cross-country skiing, fishing, downhill skiing, and picnicking.

The ways in which people recreate in the forest are ever-changing. New types of recreation are always emerging. Mountain biking, rock climbing, zip lining, and geo-caching represent activities that have recently become more prominent or that may not have even existed 20 or 30 years ago. Current developed recreation facilities, such as single-use occupancy campsites, may not meet the needs of today's recreationists who are increasingly looking for group campsites. The gap between supply and demand can lead to increased impacts from recreation, such as insufficient recreation experiences, maintenance backlogs, underutilization of developed sites, or heavily used dispersed sites. It is important that the Santa Fe NF have a sustainable recreation program that can adapt to changes in demand, available resources, and opportunities; use local volunteer efforts; and develop local and regional partnerships to cooperatively manage recreation sites and resources.

We use the desired recreation opportunity spectrum (ROS) to identify various development levels of recreation activities available to visitors. The ROS is a continuum used for managing recreation opportunities, based on a combination of physical, biological, social, and managerial settings, ranging from primeval to paved. The ROS uses the following descriptors for recreation settings ranging from least to most developed: primitive, semiprimitive-nonmotorized, semiprimitive motorized, roaded natural, rural, and urban (see the Glossary for definitions of each setting). These ROS classifications are used in project planning to measure the degree of variation from the existing classification to a new classification.

As with all desired conditions, projects implemented under the forest plan are designed to maintain or move toward desired conditions (see Contents of a Forest Plan in Chapter 1). Due to the forest-

[18] At least 8 percent of visitors indicated they participated in each of these activities (NVUM 2009).

wide scale of mapping for ROS, some inconsistencies may be present. Examples of this are existing features with long-term impacts that will not achieve the desired ROS in the life of the forest plan (e.g., roads or trails, power lines, recreation facilities, pipelines, utility corridors, etc.), or geospatial data inconsistencies, especially along ROS boundaries. Updates to improve map accuracy by resolving these inconsistencies would be administrative changes to the map.

Recreation provides abundant cultural ecosystem services. Activities such as camping, hiking, skiing, or simply going into the woods help connect individuals and families to nature. Developed recreation group sites are popular for family reunions during summer weekends, which is a traditional use of national forests in northern New Mexico. Hunting; fishing; and gathering of forest products, especially fuelwood; are important traditional activities that locals have participated in on these lands for generations.

Common to All Subsections for Recreation

Desired Conditions for All Subsections for Recreation **(FW-REC-DC)**

1 The unique cultural, historical, and ecological resources of the forest are featured through recreation opportunities, education, and interpretation. Visitors have opportunities to connect to the importance of the past, present, and future of the forest.

2 Recreation opportunities are commensurate with the desired ROS setting and enhance the economic, cultural, and social vitality and well-being of surrounding communities.

3 The forest is engaged with local communities, stakeholders, and volunteers to foster partnerships and facilitate the management of sustainable recreation.

4 Potential user conflicts are infrequent.

5 Recreation experiences are not diminished by human disturbances (e.g., vandalism, theft, and overuse).

6 Sustainable recreation opportunities are variable (e.g., recreation settings, activities, and seasonality); adaptable to changing uses and trends; and available commensurate with public interest, resource capacity, and other natural and cultural resource values.

7 Desired recreation opportunity spectrum (ROS) settings serve as the desired conditions for recreation (see Appendix A, Fig. 9-west and Fig. 9-east).

Guidelines for All Subsections for Recreation **(FW-REC-G)**

1 All project-level decisions and implementation activities should be moving toward the desired ROS mapped classes and setting descriptions to sustain recreation settings and opportunities.

2 Management activities that would substantially diminish recreation experiences (e.g., diminishing the scenic setting, facility construction or repair, or timber cutting) should not be scheduled at popular developed sites on weekends or holidays during the major recreation season (e.g., between Memorial Day and Labor Day), except in cases of wildland fire management or when doing so would otherwise not achieve project goals.

Management Approaches for All Subsections for Recreation **(FW-REC-MA)**

1. Develop or enhance partnerships and collaborate with agencies, groups, communities, volunteers, permit holders, and other individuals to increase forest stewardship, ecological awareness, volunteerism, and user satisfaction; promote a sustainable recreation program; and support local recreation-based economic development.
2. Promote established programs and develop new conservation education programs at schools, youth activities, fairs, and volunteer events that help connect people to nature, reach underserved populations, and encourage responsible use of natural resources.
3. Convene and encourage multi-stakeholder groups to address recreation maintenance concerns in specific areas.
4. Collaborate with livestock permit holders and recreationists to resolve conflicts.
5. Consider multilingual interpretation in recreation areas popular with non-English-speaking visitors.
6. Consider incorporating information technology (e.g., quick response (QR) codes, web addresses, or interactive maps) into signs and interpretive materials to direct public to additional information.
7. Consider programs to educate the public on land stewardship using minimum impact principles (e.g., Leave No Trace, Tread Lightly, or Don't Bust the Crust!).
8. Consider issuing closure orders where there is excessive resource damage or to maintain public safety.
9. Consider using sustainable operations at developed recreation sites (e.g., recycling receptacles, electric maintenance vehicles, etc.).
10. Consider issuing closure orders to establish a 14-day limit for overnight occupancy at the same location within the Santa Fe NF (consecutive or not) within a 90-day period, except as allowed by permit.
11. Develop conservation education, visitor information, and interpretation materials to inform and engage visitors and local communities. These resources are readily available and encourage increased forest stewardship, ecological awareness, visitor orientation, and knowledge of recreation opportunities. Consider developing materials in Spanish and native languages (e.g., Tanoan, Keres, and Athabaskan).

Developed Recreation

Developed recreation occurs in constructed Forest Service recreation sites such as campgrounds, picnic areas, fishing sites, trailheads, downhill ski areas, and boating ramps. Developed recreation provides more accessible experiences with features such as parking, shelters, running water, or toilets. Some developed recreation areas require fees to use them.

Desired Conditions for Developed Recreation **(FW-DEVREC-DC)**

1 Developed recreation sites meet the expectations of the public, and are sustainable.

2 Recreation facilities are safe, well maintained, and function as intended. New facilities are appropriate within the desired ROS setting.

3 Developed recreation sites complement the forest's scenery resources and scenic character.

Objective for Developed Recreation **(FW-DEVREC-O)**

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

Guidelines for Developed Recreation **(FW-DEVREC-G)**

1 Recreation developments and improvements should be planned, designed, and managed for activities and capacities that allow for sustainable use while minimizing long-term resource damage.

2 Large group events involving fewer than 75 people should be directed to designated group sites, as they are not authorized by special-use permit.

3 Design, construction, and maintenance of signage (e.g., trail markings, kiosks, and interpretive signs) and facilities should be consistent with the scenic and cultural character of the surrounding landscape and the development scale appropriate to the desired ROS class.

4 Recreation facilities and improvements should be designed to prevent human and wildlife conflicts. For example, use animal-resistant trash cans and cap or screen pipes on gates, vault toilet vents, interpretive sign bases, and reroute multi-use trails to avoid seeps and springs used by wildlife.

5 Constructed features should be maintained to support the function(s) for which they were built. When no longer used as intended, they should be repurposed to accommodate the new use or decommissioned to minimize maintenance backlog and infrastructure deterioration, and to protect public safety and health.

6 Managing recreational trends and uses (e.g., drones, satellite dishes, or slack-lining) at developed recreation sites should be considered on a case-by-case basis for protection of public safety, other resources, and quality recreation opportunities.

Management Approaches for Developed Recreation **(FW-DEVREC-MA)**

1. Consider assessing the sustainability of the developed recreation program and prioritize sites for decommissioning, closing, or repurposing the facilities.
2. Consider the volume of use, resource protection needs, and opportunities for public-private partnerships, geographic distribution, and operating costs, as well as public input, to determine the operation or closure of a site.
3. Consider adaptively managing recreation facilities and shifting limited program resources to prioritized sites.
4. Consider repurposing closed or unused facilities (e.g., fire towers, cabins, and recreation residences) as possible recreation rentals.
5. Consider posting at developed recreation sites public safety and stewardship information that includes a welcome to the site as well as rules and regulations on recreational activities.

Dispersed Recreation

Dispersed recreation is any recreation outside a developed site. It includes motorized and non-motorized uses such as dispersed camping, backpacking, rock climbing, day hiking, horseback riding, mountain biking, fishing, hunting, cross-country skiing, snowshoeing, wildlife viewing, driving for pleasure, and riding all-terrain vehicles and snowmobiles. Experiences associated with dispersed recreation can be as varied as the opportunities. Since dispersed recreation is not tied to a Forest Service facility, it can provide access to more remote areas and more solitary experiences. Secluded, less-visited spots may provide better opportunities for wildlife-based recreation such as wildlife viewing, hunting, fishing, and foraging. Dispersed recreation also occurs in many popular locations in the forest. Some of the most popular camping spots and trails are managed as dispersed recreation.

Desired Conditions for Dispersed Recreation **(FW-DISREC-DC)**

1 Dispersed recreation opportunities range from remote backcountry solitude to roadside sites along popular corridors. Dispersed recreation is consistent with management tools (e.g., the MVUM and desired ROS classes) and does not adversely affect ecological resources.

2 The design, construction, and maintenance of trails creates a trail system that is sustainable and consistent with user desires, enhances the recreation experience, diminishes user conflicts, and minimizes damage to other resources.

3 Unauthorized access (e.g., roads and trails) and non-system routes are not present on the landscape.

Objectives for Dispersed Recreation **(FW-DISREC-O)**

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

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

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

Standards for Dispersed Recreation **(FW-DISREC-S)**

1 Motorized uses are prohibited in ROS settings desired to be primitive.

2 Motorized uses are prohibited in semiprimitive-nonmotorized desired ROS settings, except for necessary administrative activities, permitted activities, and emergency access.

3 In semiprimitive-nonmotorized desired ROS settings, no new permanent motorized routes or areas shall be constructed or designated. Temporary motorized routes or road construction in semiprimitive-nonmotorized settings must be rehabilitated within 2 years of project completion.

4 Impacts to recreation opportunities resulting from the construction of temporary roads, facilities, and structures needed for management activities must be mitigated upon completion of the project.

Guidelines for Dispersed Recreation **(FW-DISREC-G)**

1 Trails should be sustainably designed, constructed, rerouted, or maintained using current best practices.

2 NFS trails should not be used for management activities that negatively impact trail conditions or the user experience unless alternatives entail greater resource damage. Adverse impacts to system trails should be mitigated upon project completion.

3 All trails (motorized and non-motorized) that adversely impact cultural resources or at-risk species should be mitigated or closed, or alternative travel routes should be developed. New trails should avoid the riparian management zone and have limited stream crossings.

4 Designated access points to natural waters should be developed within vulnerable recreation areas to protect riparian areas from widespread erosion, trampling, and the introduction of undesirable species.

5 When closing or mitigating adverse effects of dispersed recreation areas, native vegetation and natural materials should be used.

6 Dispersed camping sites should be closed, rehabilitated, or otherwise mitigated when:

- a site conditions are no longer consistent with the area's scenic integrity objective,
- b there are persistent user conflicts, or
- c unacceptable environmental damage is occurring (e.g., large areas of denuded vegetation, eroded streambanks, piles of campfire ash, or human waste impacting natural water features).

Management Approaches for Dispersed Recreation **(FW-DISREC-MA)**

1. Consider developing and implementing a plan for a forestwide trail system.
2. Consider programs and educational techniques (e.g., brochures, signs, websites, and social media) that promote visitor knowledge of:
   - Proper non-motorized and motorized trail use etiquette;
   - "Leave no Trace" principles;
   - Fire prevention, especially how to properly extinguish campfires; and
   - At-risk species habitat
3. Consider methods that would discourage the creation and use of non-motorized user-created routes (e.g., direct recreation to NFS trails).
4. Consider methods that would discourage dispersed camping near cultural sites, sensitive habitat for at-risk species, interpretive sites, and water resources.
5. Consider barriers and signage to control unauthorized use in areas with a high potential for illegal cross-country motorized vehicle use.
6. At heavily used dispersed recreation sites, consider monitoring use and the following actions as potential mitigations: relocation, conversion to designated dispersed campsites, providing additional bathrooms, or restricting overnight use.
7. Consider posting information and barriers to redirect use and encourage public compliance in site rehabilitation efforts.
8. Where forage is limited, consider providing information to encourage overnight campers with saddle or pack animals to carry weed-free cubed, pelleted, or rolled feed to limit overuse of the vegetation and discourage establishment or spread of noxious weeds.
9. Consider promoting clean camping practices (e.g., Leave No Trace, Pack-It-In, Pack-It-Out) at dispersed sites.
10. Work with other entities to connect trails in Santa Fe NF with other trails on or through adjacent lands.

Recreation Special Uses

Recreation special-use authorizations allow the use and occupancy of NFS lands when the proposed activity supports the Forest Service mission, meets demonstrated public needs, and aligns with the desired conditions for the use area. Tourism, nature-based outdoor recreation, and other special recreational uses encourage responsible use by visitors and local communities. Recreation special uses may include ski areas, outfitter and guides (e.g., hunting, rafting, and backpacking), recreation events, and recreation residences (e.g., the Holy Ghost recreational residences), and the Cowles Lease Area.). Many recreational special uses provide economic opportunities and sustainability to local communities.

Desired Conditions for Recreation Special Uses **(FW-RECSU-DC)**

1 Recreation special-use authorizations (e.g., outfitters and guides, competitive races, family reunions, special events, Ski Santa Fe, and recreation residences) provide unique opportunities, services, and experiences for the recreating public and address a demonstrated demand for a specific recreation opportunity.

2 Recreation special-use authorizations are timely, efficient, user-friendly, and consistent across similar locations and uses.

3 Recreation special-use authorizations provide for public demands without causing movement away from desired conditions for ecological resources and multiple uses.

4 Services provided by recreation special-use authorization holders enhance the recreation experiences of forest visitors, ensure public health and safety, and protect natural resources and unique features. Recreation special uses contribute to the local economy by providing small business opportunities.

Standard for Recreation Special Uses **(FW-RECSU-S)**

1 Commercial use of domestic sheep and goats (e.g., for filming, as pack animals, etc.) must not be authorized in areas occupied by or adjacent to bighorn sheep or in areas where bighorn sheep travel, to prevent the spread of disease between domestic and wild populations.

Guideline for Recreation Special Uses **(FW-RECSU-G)**

1 Special use authorizations for recreation events and outfitting and guiding services should be analyzed relevant to any available capacity studies, possible use of nominal effects determinations, and other administrative tools.

Management Approaches for Recreation Special Uses **(FW-RECSU-MA)**

1. Collaborate with New Mexico Game and Fish, New Mexico Council of Outfitters and Guides (NMCOG), and other New Mexico national forests to coordinate special-use authorization consistency for outfitters and guides. Consider convening an annual meeting between forest, State, and NMCOG representatives to discuss issues and management strategies.
2. Consider creating a forestwide policy for administering common recreation special-use authorizations and non-compliance issues.
3. Consider conducting capacity studies to determine the number of special-use authorizations that should be issued for popular commercial recreation activities.
4. Consider directing applicants desiring special-use authorizations on heavily used areas to alternative areas that can better support the desired activities.

Roads

"I drive the roads through this area because I would be unable to access any other way. My mother would not be able to access the mountains without the roads."

(Public comment for Wilderness Evaluation, fall 2016).

The Santa Fe NF road system consists of thousands of miles of arterial, collector, local, and closed roads as well as bridges. The construction and maintenance of the road system includes the roadbed, culverts, cattle guards, gates, drainages, signage, and clearing of brush and overgrowth.

Motor vehicle use maps (MVUM) identify motorized routes (roads and motorized trails) open to the public. This designated system provides motor vehicle access to and through the Santa Fe NF including private land inholdings, recreation sites, traditional uses, fuelwood and forest product gathering areas, and administrative and recreation facilities. Additional roads exist on the ground and are only available for administrative or permitted purposes, but still may require management, especially to prevent ecological damage. These roads provide access to range or wildlife developments, acequia infrastructure, residences, and management projects (e.g., restoration). Temporary roads are roads authorized by contract, permit, other written authorization, or are necessary for emergency operations. A temporary road is not an NFS road, part of the forest transportation system (MVUM), or necessary for long-term management. A well-designed, managed, and maintained forest road infrastructure allows for these opportunities.

Maintenance keeps roads and bridges safe for use and free from causing ecological damage such as road erosion. Routine maintenance and upkeep is performed with a dedicated road crew and contractors for larger and more complicated projects. Future management of roads will increasingly rely upon cooperative forest road agreements to maintain the ecological integrity of the road system as well as vehicle safety. Agreements will need to be made with State, county, and local governments, or with other Federal agencies. Special use authorizations (e.g., permits, easements, etc.) are needed with private landowners and tribal governments.

Maintenance levels are used to describe the service provided by and maintenance required for any road. A maintenance level 1 road requires the least amount of maintenance and gives the user the lowest comfort level; these are closed to public use and open only for administrative purposes such as fire management or vegetation improvement projects. A maintenance level 5 road has a smooth surface that allows the user a moderate degree of comfort and convenience at moderate travel speeds but also requires the most maintenance. Level 3 and 4 roads are suitable for passenger cars and level 1 and 2 roads are suitable for only high-clearance vehicles. The Santa Fe NF has the most miles of maintenance level 1 and 2 roads, while miles of maintenance level 4 roads are rare, and there are no maintenance level 5 roads.

The road system allows people to gain access to the Santa Fe NF for provisioning ecosystem services such as food, water, recreation, and fuelwood. Many of these provisioning ecosystem services are also traditional uses and cultural ecosystem services in northern New Mexico. The road system additionally supports the ability of the forest to provide regulating ecosystem services through improving access to and ease of implementation of project work that promotes forest health.

Desired Conditions for Roads **(FW-ROADS-DC)**

1 Safe transportation system and infrastructure accommodate needs for public access, land and resource management, and permitted activities, while contributing to social and economic sustainability.

2 Unauthorized access and non-system routes are not causing adverse impacts to environmental or cultural resources.

3 Roads do not adversely affect watercourses or sensitive riparian areas.

4 Forest roads, bridges, and trails provide safe and reasonable access for traditional and cultural uses.

5 Use of NFS roads does not hinder wildlife movement or interrupt critical life-cycle needs (e.g., calving, nesting, and mating).

6 NFS roads are well-marked and provide for traveler safety and information.

Standards for Roads **(FW-ROADS-S)**

1 Motor vehicle use must be managed to occur as depicted on the most recently updated motor vehicle use map (MVUM), except as authorized (e.g., by law, permit, etc.).

2 New motorized routes or areas must not be constructed in areas designated as primitive or semi-primitive non-motorized in the desired ROS.

Guidelines for Roads **(FW-ROADS-G)**

1 Road decommissioning, construction, and maintenance should incorporate best management practices (e.g., FSH 2509.22 - Soil and Water Conservation Practices Handbook).

2 Bridges and transportation infrastructure found to serve as important habitat for at-risk wildlife should not be demolished unless demolition is necessary for safety along the travel route.

3 New forest roads and other infrastructure (e.g., recreation facilities, airstrips, etc.) should be designed and constructed to limit the delivery of sediment and pollutants to waterbodies.

4 When a practical alternative does not exist, the footprint of new roads constructed in the riparian management zone should be as small as practical and the design should include mitigations to minimize or eliminate resource damage to ecological resources. The number of designated stream crossings and the footprint of new roads constructed should be limited to as few as practical to avoid impacts to these features.

5 Decommissioning of roads at the project level should be based on resource needs.

6 After management activities occur in areas with high potential for unauthorized motorized vehicle use, methods (e.g., barriers, signs, and law enforcement) should be used to prevent unauthorized motor vehicle use.

7 Reconstruction and rehabilitation of existing roads should be emphasized over new road construction.

8 Temporary roads (e.g., that support ecosystem restoration activities, fuels management, or other short-term projects) should be closed and rehabilitated (restored to more natural vegetative conditions) upon project completion to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use.

9 Construction of new roads and trails or reconstruction and maintenance of existing roads intersecting fish-bearing streams should accommodate aquatic organism passage.

10 If at-risk species are present and will be impacted by road construction or maintenance activities, work should be conducted to avoid or minimize noise and habitat disturbance and outside of critical life-cycle periods (e.g., breeding or nesting for birds) or when animals may not be present (e.g., during migration).

Management Approaches for Roads **(FW-ROADS-MA)**

1. Collaborate with federally recognized tribes to provide additional access to locations within the Santa Fe NF beyond what is available in the MVUM (e.g., through the Tribal Forest Protection Act).
2. Within project areas, prioritize decommissioning of roads and routes that are redundant, that adversely impact flow regimes, that are not used by the public, or that cause resource damage.
3. Consider mitigating or closing roads that may be susceptible to landslides, rock falls, or other landslide movements and hazard trees.
4. Maintain relationships and communications with internal and external customers as well as partners. Consider notifying local governments, partners, adjacent landowners, permit holders, etc., of changes in road status and significant deviations in traffic patterns.
5. Prioritize road system maintenance to provide for safe travel on all roads as well as to prevent or mitigate resource damage. Consider continuing current maintenance agreements and entering into new agreements with other entities including Federal, State, tribal, and local government agencies, as well as private organizations and individuals.

Facilities

"Visitor-focused trail development including trailhead infrastructure such as parking, bathrooms, and signs attract visitors and encourage repeat visits, and lead to tourism dollars for rural communities."

(Public comment on the Notice of Intent, summer 2016)

The Santa Fe NF has both administrative and recreation sites and facilities that it must maintain as safe and functional for employee and public use. Facilities and infrastructure include the site (driveways, parking, landscaping), buildings, and the utilities (electric, water, wastewater) that service the site and building. Administrative facilities are the support facilities for Forest Service personnel. Many of the administrative facilities are accessible to the general public for getting information and buying permits. The forest manages many recreation facilities and sites including campsites, trail heads, scenic vistas, vault toilets, and other structures that support recreation. Dams in the forest are also considered part of facilities and infrastructure. Other infrastructure such as fish barriers, range infrastructure, communication sites, and utility corridors are addressed elsewhere in the forest plan. Most facility maintenance and construction is completed through the use of qualified private contractors.

Properly designed and maintained facilities such as dams, septic systems, and roads help people use the forest, while minimizing ecological impacts. Facilities help support communities economically and socially by providing access to and enjoyment of recreational resources and experiences. Facility condition and maintenance needs are variable and depend on factors such as age, original construction, past maintenance, and location. The facility condition index is used as a standardized agency method to monitor facility condition. It rates buildings as good, fair, or poor by using a calculation based on deferred maintenance costs and replacement value.

Facilities and infrastructure support cultural ecosystem services through campgrounds, fishing areas, trailheads, scenic vistas, toilets, and other infrastructure that supports recreation. Provisioning ecosystem services are provided by dams that hold drinking water for communities surrounding the forest. And, because administrative facilities sell permits for forest products, like fuelwood, they provide provisioning and cultural ecosystem services.

Desired Conditions for Facilities **(FW-FAC-DC)**

1 Infrastructure is safe and functions as intended or is adapted to accommodate the current and/or anticipated demands; the facilities provide an environment free from recognized hazards for people, while avoiding or minimizing negative impacts to natural, cultural, and social resources.

2 Surrounding vegetative conditions and building materials aid in the protection of infrastructure from wildfire and do not consist of invasive vegetation.

3 Facilities are energy-efficient, promote resource sustainability, and effectively serve their intended purpose.

4 Facilities are broadly accessible to forest users, including persons with disabilities.

Guidelines for Facilities **(FW-FAC-G)**

1 New structures (e.g., buildings, campgrounds, and water systems) or other above-ground facilities should adhere to scenic integrity objectives and should not be located in areas of very high and high scenic integrity unless they are designed to blend in with the general landscape.

2 Construction of new facilities in floodplains, wetlands, and other environmentally sensitive areas should be avoided. When this cannot be accomplished in a reasonable manner, the amount and area of disturbance should be as small as practical.

3 Infrastructure design, construction, reconstruction, and maintenance should prevent or mitigate impacts to terrestrial and aquatic species (e.g., using no reflective surfaces that would cause confusion and collision by birds and accommodating appropriate movement for fish and other aquatic organisms) and decrease species mortality.

4 Facilities should use native plants in the design of landscape features.

5 Exterior lighting for new and reconstructed facilities should be designed to minimize light pollution as much as practical, unless where necessary to provide for public safety and accessibility.

Management Approaches for Facilities **(FW-FAC-MA)**

1. Consider a comprehensive preventive maintenance program for buildings and infrastructure to minimize major unplanned repairs or replacements.
2. Prioritize infrastructure needs and investments for current need and long-term planning goals as described in facilities master plan, sustainable recreation plan, recreation facility analysis, and other resource planning documents, and health and safety requirements for employees and visiting public. All infrastructure with employee occupancy is subject to the Occupational Safety and Health Administration standards and will be evaluated regularly to protect the health and safety of forest employees, volunteers, and the visiting public.
3. Consider decommissioning potable water systems that no longer serve the current needs.
4. When work is being planned for administrative facilities and infrastructure that are historic resources, work with the heritage program and partnerships to administer and maintain facilities according to the facility master plan and any developed preservation maintenance plans (historic property plans)
5. Consider partnerships with local, academic, State, Federal, tribal, non-governmental organizations, and special interest groups to conduct maintenance or to repurpose excess infrastructure as outlined in facilities master plans, sustainable recreation plan, recreational facility analysis, and other resource planning documents, while following applicable standards and guidelines.
6. During project planning and design, determine feasibility, cost, and benefits of using photovoltaic systems for administrative facilities, range improvements, resource monitoring, public safety, and recreation projects.

Lands and Realty

"It is important to me and my family to have access to experiencing nature."

(Public comment during the Assessment, spring 2014).

The Santa Fe NF encompasses 1,681,028 acres, within which 135,679 acres are owned by the State of New Mexico, various federally recognized tribes, land grants, and private entities. In addition, much of the national forest boundary adjoins other Federal lands like the Valles Caldera National Preserve, Bandelier National Monument, Los Alamos National Laboratory, Bureau of Land Management lands, and the Pecos National Historic Site. This section includes three subsections related to landownership management: (1) "all-lands," which is the concept of cross-boundary management with adjacent land managers; (2) land status, which is the administration of the NFS land along with associated property rights and boundaries; and (3) lands special uses, which are authorizations for communication sites, utilities (e.g., electrical, communication, and internet lines), pipelines (e.g., natural gas, water), road access, sanitation, and commercial filming.

Cross-Boundary Management

Ecological processes are seldom confined by administrative and jurisdictional boundaries, so the impacts of management policies on adjacent lands are important to the Santa Fe NF. Restoration activities to improve watershed health, increase water quantity, improve water quality, generate rural prosperity, and meet a shared vision of healthy, resilient landscapes cannot happen in a fragmented manner, but must be on a scale that supersedes ownership. An all-lands approach brings landowners and stakeholders together across boundaries to develop common goals for the landscapes they share and achieve long-term objectives. An approach of collective responsibility promotes landscape-scale ecological health and sustainable uses, and helps provide sustainable natural resources for the public.

Cross-boundary management has an important role in maintaining and improving ecosystem services that require larger landscapes. Supporting ecosystem services involved in water cycling, biodiversity, and pollination involve ecological systems that are not contingent upon administrative boundaries. Similarly, regulating ecosystem services that equilibrate key systems such as climate and water flow, disease, and water and air quality expand beyond the boundary of the Santa Fe NF.

Desired Conditions for Cross-Boundary Management **(FW-XBOUND-DC)**

1 The transition from forest NFS lands to adjacent lands with similar desired conditions is seamless and does not exhibit abrupt changes in visual or ecological integrity.

2 Natural-appearing landscapes are interconnected throughout the forest, benefitting wildlife habitat, watershed health, and recreational opportunities.

3 A cohesive network of roads and trails connects the forest to adjacent lands, facilitating seamless access for multiple uses (e.g., traditional, cultural, recreation, and forest product collection) across forest boundaries.

4 Land ownership adjustment activities foster an improved landownership pattern, sound community development, and more effective management of NFS lands.

Guidelines for Cross-Boundary Management **(FW-XBOUND-DC)**

1 Private lands should be acquired from willing and interested sellers where Forest Service administration of those lands would promote connectivity and manageability.

2 The following criteria should be used to prioritize parcels identified as base-in-exchange or desirable lands for acquisition:

- a Land sharing borders with designated and recommended wilderness areas, inventoried roadless areas, and other congressionally and administratively designated areas.
- b Presence of critical habitat for threatened, endangered, sensitive, or other at-risk species.
- c Potential to eliminate gaps in public access or to otherwise create a more cohesive trail system.
- d Potential to improve management of the ecosystem and reduce administrative expenses through consolidation of NFS ownership or split estates.
- e Presence of or proximity to sensitive wetlands and riparian management zones.
- f Potential for development of private inholdings that could have adverse effects on surrounding forest landscapes.
- g Presence of unique cultural resources and values.
- h Potential to provide access for landscape restoration projects and fire suppression activities.

Management Approaches for Cross-Boundary Management **(FW-XBOUND-MA)**

1. Collaborative relationships with adjacent landowners, users, and public land managers (e.g., counties, states, federally recognized tribes, and other federal agencies) are actively encouraged to develop contiguous road and trail systems across multiple ownerships.
2. Collaborative relationships with traditional forest-dependent communities help ensure traditional and cultural uses are incorporated into the management of any newly acquired lands.
3. Work with interested stakeholders to identify suitable parcels for acquisition and explore funding opportunities that leverage the Land and Water Conservation Fund, grant opportunities, and private financing.

Realty and Access

The lands program identifies and maintains land line locations between NFS lands and lands of other ownership, and administers landownership adjustments. Boundary identification is important to prevent encroachment onto NFS lands. Landownership adjustment activities consolidate and improve management efficiency of resources through realty conveyances within the proclaimed Santa Fe NF boundary. The acquisition, protection, and management of road and trail rights-of-way ensure public access to NFS lands, as well as access through NFS lands to private inholdings.

The manner in which land status and the boundaries of the Santa Fe NF are administered is essential to how the public accesses the forest. As such, it provides for cultural ecosystem services like recreation and education opportunities. In addition, access allows people to continue finding food (through hunting, fishing, and gathering), water, and wood, and obtain fuelwood to heat their homes. These are both cultural and provisioning ecosystem services. Finally, the management of vegetative fuel loads in the wildland-urban interfaces around private property provides regulating ecosystem services by helping to protect these areas from fire.

Desired Conditions for Realty and Access **(FW-REALTY-DC)**

1 NFS lands are largely contiguous and promote efficient and effective management of various lands and resources found within the forest.

2 Rights-of-way and easements for NFS roads and trails provide access to lands within the forest.

3 Owners of private inholdings have reasonable access through the forest to their property.

4 Forest boundaries are identified and appropriately marked to avoid creating false or misleading boundaries, trespass, or encroachment.

5 Boundaries of areas with special management direction (e.g., designated wilderness) are clearly marked at access points and where unauthorized use is likely to occur.

Standards for Realty and Access **(FW-REALTY-S)**

1 No new access points to private property will be authorized if a parcel is subdivided, unless public safety or natural features dictate otherwise.

2 Search for and protect existing land monuments before implementing ground-disturbing management activities.

3 New infrastructure (e.g., septic tanks, wells, utility lines) serving private inholdings must be located on private property, existing easement, or right-of-way.

4 Access reciprocity must be a condition of new easement authorizations if the forest desires access through private land to adjacent NFS land.

Guidelines for Realty and Access **(FW-REALTY-G)**

1 Rights-of-way for roads, utilities, and communications sites should maximize use of existing infrastructure before new uses are authorized, with the intent to minimize impacts to other resources.

2 Land ownership adjustment should result in the creation of a more contiguous land base, and should not create isolated NFS parcels surrounded by lands of other ownership or isolated lands of other ownership parcels surrounded by NFS lands, unless it is found to be a public benefit.

3 Special use authorizations for access to inholdings with multiple owners should be conveyed to a Road Users Association or to a subdivision of local government to ensure the equitable and adequate maintenance of the road and minimize the needs associated with permit administration.

4 Special use authorizations for access to private property through NFS lands should not be granted unless there are no other means of access.

Management Approaches for Realty and Access **(FW-REALTY-MA)**

1. Consider encouraging the protection of existing public access and the acquisition of new access opportunities to NFS lands.
2. Consider updating the existing landownership adjustment plan, which will identify lands desirable for acquisition, as well as identify parcels or areas as suitable for exchange or sale.
3. On easements acquired from private landowners, consider prioritizing public access interests over road closures.
4. Consider using the following criteria to prioritize boundary management surveys:
    - Where known litigation is pending, a title claim has been asserted, encroachments are suspected, or the probability of encroachment can be reduced.
    - Where significant resource values exist and use or manipulation of resources is planned (this includes the location, by survey, of easements necessary for resource management).
    - Ensure that any project that occurs near or adjacent to any NFS boundary does not proceed until the legal NFS boundaries are properly located and physically marked in the field prior to any management action.
    - Help prevent boundary disputes or loss of NFS land and its resources.
    - When all remaining property boundary lines have not been previously surveyed.

Lands Special Uses

Occupancy and use of NFS lands for public and private purposes, where the use is consistent with natural resource management goals, occur through the issuance of special-use authorizations and easements. A wide range of uses may be permitted including, but not limited to, community water systems, water storage and transmission, electric transmission and distribution lines, communications sites, alternative and renewable energy generating facilities, research permits. Authorizations also facilitate partnerships between the Forest Service and private businesses, academia, non-governmental organizations, and individuals.

Lands special-use authorizations provide for provisioning ecosystem services by allocating land for the use of infrastructure, which allows for communication sites, electrical utilities, and pipelines (e.g., natural gas and water). Commercial filming and academic research authorizations support cultural ecosystem services.

Desired Conditions for Lands Special Uses **(FW-LANDSU-DC)**

1 Special use authorizations are responsive to demands for commercial or other use of NFS lands, while protecting sensitive ecological resources and maintaining multiple uses.

2 The special-use authorization process is timely, efficient, user-friendly, and consistent across similar landscapes and uses.

3 Authorized roads, utilities, and communications sites and corridors have minimal impacts on natural resources.

4 Vegetation within energy corridors allows for effective maintenance and operation of associated infrastructure, while retaining enough natural ecological characteristics to sustain wildlife and their habitats.

5 Environmental, visual, and sound impacts of emerging technology, communication sites, utility corridors, and other authorized infrastructure are minimal as a result of coordination and co-location and are in harmony with the surrounding landscape.

6 Research authorized on the forest results in improved understanding of the science of natural and social resources and uses without negatively impacting long-term ecological conditions.

Standard for Lands Special Uses **(FW-LANDSU-S)**

1 Permits for utilities that require use of roads not listed on the MVUM must incorporate requirements for road construction, reconstruction, or maintenance.

Guidelines for Lands Special Uses **(FW-LANDSU-G)**

1	New authorized power or other utility distribution or service lines should be buried, if site conditions permit, to reduce fire hazard and minimize impacts to other forest resources.
2	To minimize the potential hazards associated with diesel-powered generators, propane generators or renewable energy sources should be used at facilities operating under a lands special use permit that require onsite power generation.
3	Special use authorizations for roads, utilities, and communications sites should maximize use of existing infrastructure and utility corridors before new uses are authorized, with the intent to reduce ground disturbance.

Management Approaches for Lands Special Uses **(FW-LANDSU-MA)**

1. Consult with local governments to synchronize forest decisions for authorizations, permits, leases, and easements with local planning and zoning ordinances where local and forest objectives are complementary.
2. Identify locations suitable for commercial filming for inclusion in a ‘menu’ of options subject to streamlined authorization.
3. Recognize and grant priority status to applications for utility developments in existing transmission corridors that transmit energy from renewable sources.

Energy, Minerals, and Caves

"The geology of the Santa Fe National Forest, ranging from the spectacular recent volcanism of the Jemez Mountains to the three-billion-year-old metamorphic rocks in the Nacimiento and Pecos mountains, makes the forest a natural earth science classroom for all ages."

(Larry Gore, Geologist for the Santa Fe National Forest)

This group of resources includes the leasable, locatable, and salable minerals found within the Santa Fe NF. The leasable minerals include oil and natural gas as nonrenewable energy sources and geothermal resources as renewable energy source. The locatable minerals are things such as gold, silver, copper, and uranium. The salable minerals are the products such as sand, gravel, landscaping rock, volcanic cinders, and pumice. Alternative energy production from sources like wind, solar, and biomass is also included in this section. These resources are divided into three broad categories in this plan: Leasable Minerals, Alternative Energy, and Solid Minerals.

Mining and mineral resources provide provisioning and cultural ecosystem services important to communities and people around the forest. Provisioning ecosystem services are provided through natural gas deposits, mineral resources, renewable energy generation potential, and electric transmission lines that cross NFS lands. Cultural ecosystem services are provided by clay deposits and other stones used in artwork and traditional practices.

Leasable Energy Minerals

Oil and natural gas were discovered on the northern end of the Cuba Ranger District in the 1940s, and have been continuously produced since then. The Santa Fe NF is located on the eastern edge of the San Juan Basin, and it is unlikely that significant undiscovered oil and gas reserves exist. Oil and gas production is slowly declining as the field is depleted.

The geothermal hot springs in the Jemez Valley (Jemez Ranger District) were known and utilized by the native tribes prior to Spanish settlement, and several were developed into spas as early as the 1870s. These uses continue today. There was extensive exploration to see if it would be feasible to build a geothermal electrical generation power plant in the 1970s, but development was not found to be economically viable. Most of the Jemez Valley was withdrawn from geothermal development by the designation of the Jemez National Recreation Area in 1993, and the geothermal leasing decision in 2018 closed the remainder of the Jemez Mountains to geothermal leasing.

Leasable minerals are disposed of through leases issues by the Bureau of Land Management after the Santa Fe NF consents to leasing and provides the appropriate stipulations for each lease. Development of the leases may only occur after site-specific NEPA analysis for each proposed development is prepared by the Forest Service and the Bureau of Land Management (BLM).

Desired Conditions for Leasable Energy Minerals **(FW-LEASEMIN-DC)**

1 Surface resource impacts resulting from energy mineral development do not have adverse long-term effects on ecosystem health or watershed conditions.

2 Reclamation of energy mineral extraction areas restore resource damage and remove public safety hazards.

Standards for Leasable Energy Minerals **(FW-LEASEMIN-S)**

1 Surface uses in extractive mineral energy operations must be controlled through plans of operation and permits that provide for the long-term protection and sustainability of all affected resources.

2 Lands within the 168,650-acre Geothermal Analysis Area in the Coyote, Cuba, Española, and Jemez Ranger Districts (figure 3) will not be leased for geothermal exploration or development.[19]

[19] Geothermal leasing outside of the Geothermal Analysis Area must undergo site-specific environmental analysis to determine if leases can be authorized and what site-specific stipulations may be required.

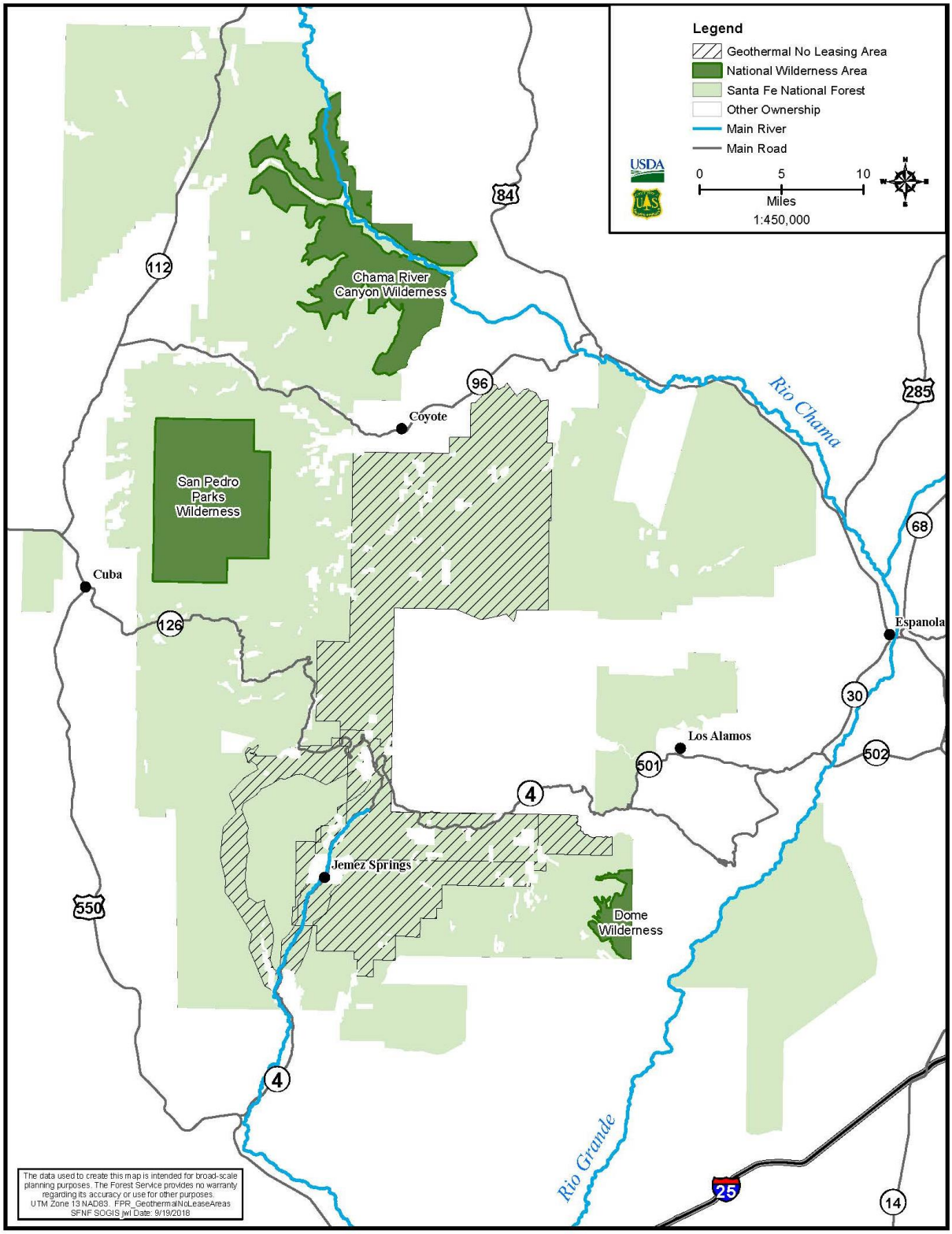


Figure 3. Santa Fe NF geothermal no-leasing area

Renewable Energy

This section covers renewable energy sources like wind, solar, and biomass. There is no history of alternative energy development in the forest and none is reasonably foreseeable.

Desired Condition for Renewable Energy **(FW-RENEWENERGY-DC)**

1	Exploration, development, production, and transmission of renewable energy resources contribute social and economic benefits to local communities and are conducted in a manner that minimizes adverse long-term impacts to forest resources and uses, ecosystem health, and watershed conditions.

Management Approaches for Renewable Energy **(FW-RENEWENERGY-MA)**

1. Consider identifying areas suitable for solar and wind energy based on energy potential, access, and impacts on other resources. Encourage development of wind and solar energy in these areas.
2. Consider encouraging renewable energy development in areas with the highest generation potential and fewest resource conflicts by:
    - providing financial incentives to developers, including less frequent adjustments to rent and longer phase-ins for other fees;
    - allowing standard bonds as opposed to bonds based on full reclamation costs;
    - awarding leases in these areas through competitive processes; and
    - streamlining the leasing process by, for example, granting applicants site control earlier.
3. Upon receipt of application for development of solar and wind energy facilities, consider modification of road designations and relocation to accommodate development of these renewable energy-producing facilities.

Solid Minerals

Solid mineral resources include locatable mineral deposits (e.g., gold, silver, copper, uranium, some non-metallic minerals, and rare earth elements) and salable materials (e.g., sand, gravel, cinders, common building stone, and flagstone).

Locatable Minerals

Although mining has not been proven, the copper deposits in the Jemez Valley were known during the early Spanish settlement; and there are stories the mission bells were cast using locally produced copper. Copper mining in the Jemez Valley (Jemez Ranger District) and east of Cuba (Cuba Ranger District) is known to have begun in the 1890s. Some of these copper deposits were mined intermittently through the early 1970s. The Cochiti mining district (Jemez Ranger District), in Bland, Cochiti, and Colle Canyons, was active between 1894 and 1903, and produced gold, silver, copper, and lead. The Pecos Mine (Pecos Ranger District) was discovered in 1881, and was most active between 1916 and 1939. It produced lead and zinc. Small uranium deposits were developed and mined during the 1950s and 1960s, but no large deposits were found.

The General Mining Act of 1872 (30 U.S.C. 22-42) grants U.S. citizens the right to prospect and explore for minerals on lands open to mineral entry. The right of reasonable access for exploration and development of locatable mineral is guaranteed. The Forest Service can require reasonable protection of surface resources and compliance with other Federal laws (i.e., Clean Water Act, Endangered Species Act, Archeological Resources Protection Act, etc.), but cannot deny a request to explore and develop the minerals on NFS lands. There are a few small-scale (hobby) mining operations for locatable minerals on the Santa Fe NF, but no commercial production has occurred since the 1970s, and none is reasonably foreseeable.

Salable Minerals

Before Spanish settlers arrived, native peoples used clay, building stone, chert and flint, and obsidian, along with other minerals for pigments, and these uses continue today. Pumice and volcanic cinders have been mined commercially since the 1940s, for use in cinder blocks in the Jemez and Española Ranger Districts. During the time commercial logging has occurred, local sources of road materials such as gravel and crushed rock have been used to maintain forest roads.

The commercial production of salable minerals will continue at a reduced level as the deposits currently being used are mined out, and environmental concerns make development of new sources difficult. The Forest Service has the authority to allow for public use and sale of these materials and public lands through a variety of discretionary methods.

Desired Conditions for Solid Minerals **(FW-MINERAL-DC)**

1 Energy, mineral, and mining activities meet the legal mandates to facilitate the development of minerals in a manner that minimizes adverse impacts to surface and groundwater resources, watershed and forest ecosystem health, wildlife and wildlife habitat, scenic character, and other desired conditions applicable to the area.

2 Reclamation of energy, mining, and mineral activity sites provides for public safety and the protection of forest resources and is conducted to return sites to a natural condition as nearly as possible.

3 Appropriately remediated abandoned mines are available for roosting bats, reducing the potential for displacement, abandonment of young, and possible mortality.

4 Caves designated or nominated as "significant" maintain those features, characteristics, values, or opportunities for which they were designated.

Standards for Solid Minerals **(FW-MINERAL-S)**

1 Surface uses in mineral operations must be controlled through plans of operation and permits that provide for the long-term protection and sustainability of all affected resources.

2 In mineral sites exceeding 5 acres, mined-out areas must be stabilized or reclaimed as new mine areas are opened.

3 Prior to the destruction of access to adits, shafts, and other mine workings, a biological inventory and assessment must be conducted to determine use by bats and other wildlife species. If determined to be used by wildlife, consider gating as an alternative to destruction.

4 Mining activities must incorporate mitigation and reclamation measures that reduce visual contrasts with the surrounding landscapes.

5 All mineral-related activities must include reclamation of surface resource impacts, whether or not a plan of operation is required

6 Reclamation must be carried out concurrently with mining; restoration of the environment must occur at the earliest opportunity for each area on a mine site.

7 Approval of mining activities must include the use of reclamation bonds to protect and restore surface resources.

8 On site disturbances where radionuclides may exist, reclamation must eliminate any potential for radionuclide exposure to humans and the environment. Readings for radionuclide levels must be taken after reclamation to ensure remediation to background levels or below.

9 Plans of operation must include contingencies to address stabilization and interim reclamation of mineral sites during periods of unforeseen shutdown (e.g., as in 36 CFR 228.10). This contingency plan would apply any time mine activity ceases during development and production, and before planned closure.

10 The structures and/or occupancy for mining purposes must be limited to only those necessary and incidental to approved mining operations.

11 When closing underground mine features to public entry, pre-closure inspections must be conducted to determine if cave-dependent species are present. Closures must be designed and implemented to address the needs of resident or historically occurring wildlife within the constraints of meeting public safety concerns.

Guidelines for Solid Minerals **(FW-MINERAL-G)**

1 If, in the public interest, the responsible official should respond to requests for mineral materials through the NEPA process, advertised sale (if appropriate), and permit administration.

2 The potential to use sites for mineral collection areas or future exploration and development should be considered when a reclamation plan is being developed.

Management Approaches for Solid Minerals **(FW-MINERAL-MA)**

1. Collaborate with the New Mexico Department of Game and Fish on pre-closure inspections of underground mines to determine if cave-dependent species are present, and if so, to determine how to design and implement a closure that addresses the needs of resident or historically occurring wildlife within the constraints of meeting public safety concerns.
2. Prior to the destruction of access to adits, shafts, and other mine workings, consider providing opportunities to record mineral resource information when safe.

Caves

Caves are defined as any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the Earth or within a cliff or ledge large enough to permit a person to enter, whether the entrance is excavated or naturally formed. Caves are unique resources and provide habitat for species not found elsewhere. Caves provide conduits for groundwater flowing from one surface watershed to another.

The number of caves in the forest is unknown; but there are favorable formations for solutions caves (limestone and gypsum), lava tubes, tectonic caves (underground spaces created by the falling and/or sliding of rock beds), and weathering caves (alcoves created by erosion of softer units from beneath more resistant beds) underlying much of the forest.

Numerous caves and rock crevices appear throughout the varied landscapes in the Santa Fe NF. One critical site in the area is Jemez Cave, which is on the National Register of Historic Places because of its cultural significance to local Pueblo people. Here, some of the earliest remnants of corn dating to around 2,500 years ago during the Late Archaic have been found, suggesting early beginnings of agriculture in the area. This is one of many caves in the Santa Fe NF with ties to federally recognized tribes in the area. Other caves in the forest are used for recreational activities, although this use is low. Some caves are closed to public access to protect their significant cultural resources from vandalism and recreation damage. Other caves remain open as long as monitoring does not reveal a prevalence of vandalism or use-related damage.

Caves management is currently covered under several resource areas, including recreation, archeology and cultural resources, biology, and geology. In accordance with the law, caves can be managed as either permitted open with year-round use, permitted seasonally, open with interpretation, or closed year-round.

Due to their cultural or ecological importance, significant caves can provide cultural ecosystem services or provisioning and supporting ecosystem services. As many significant caves are archaeological sites and have cultural or spiritual meaning for local tribal communities, the preservation of these sites provides important cultural ecosystem services to these peoples and to other forest users by maintaining a sense of place and history, and providing educational value. Caves also provide ecological supporting ecosystem services by supporting biodiversity through their provision of unique habitats, and those that support bat colonies can provide pest-reduction services over large areas, benefiting local agriculture. Caves role as part of the groundwater ecosystem is also a provisioning ecosystem service.

Desired Conditions for Caves **(FW-CAVES-DC)**

1 Caves provide habitat for species that require specialized conditions for roosting and overwintering, such as bats. Caves maintain moisture and temperature levels consistent with historic conditions. They do not contain bat diseases, such as white-nose syndrome.

2 Archaeological, geological, paleontological, and biological features of caves are not adversely affected by visitors.

Standards for Caves **(FW-CAVES-S)**

1 Prior to physically closing caves to public entry, pre-closure inspections must be conducted to determine if cave-dependent or other species are present. Cave closures will only occur when it is the only viable option to protect cave resources. If a gate is utilized as part of the closure, it must allow free passage of bats, small animals, air, and water.

2 Caves that are important nurseries or hibernacula for sensitive and local concern bat species, including known bat day and night roosts, must be protected and their microclimates must be maintained during management activities (e.g., timber harvest, road construction, or recreation facilities).

3 Recreational activities inside caves must only be promoted for designated recreational caves.

4 Public information concerning location and access to non-recreational caves must be limited.

Guideline for Caves **(FW-CAVES-G)**

1 Geologic and physical features (e.g., talus slopes, cliffs, canyon slopes, or caves) should be protected from damage or loss to retain their importance for wildlife habitat and ecological functions.

Management Approaches for Caves **(FW-CAVES-MA)**

1. Collaborate with other State and Federal agencies, non-governmental organizations, and universities as well as local, regional, and national speleological societies to identify significant caves, obtain data, encourage research on karst environments and karst-dependent species, and develop conservation strategies for protecting karst-dependent species and their habitats.
2. Consider limiting logging, road construction, and other uses of heavy equipment above or in the vicinity of a cave with a thin roof, or the course of such a cave, if there is potential for damage.
3. Consider retaining vegetation in the vicinity of a cave or cave course to protect the cave's microenvironment.
4. If timber harvesting is permitted near a cave, consider directionally felling trees away from a cave and its course.
5. Consider avoiding altering cave entrances or using them as disposal sites for slash, spoils, or other refuse.
6. Consider limiting management activities within any area draining into a cave, as they may affect the cave ecosystem with sedimentation; soil sterilization; the addition of nutrients or other chemicals, including pesticides, herbicides, and fertilizers; or change the cave's natural hydrology.
7. Consider avoiding the diversion of surface drainage into caves.
8. Consider limiting public access to prevent damage to cave resources, when there are unusual safety hazards, or when it is necessary to prevent the spread of diseases such as white-nose syndrome.
9. Consider avoiding advertising the location of caves to the general public in printed documents or with signs.

10. Consider prohibiting camping and campfires within 200 feet of cave entrances, mines, and rock shelters used by at-risk species.
11. Consider developing prescribed burn plans to avoid or minimize smoke influences at or around at-risk species bat caves.
12. Consider recognizing and documenting karst features when they are found to occur across the landscape; these features include caves, springs, sinkholes, and losing streams.
13. Consider incorporating measures for protecting caves into project plans for road construction, timber harvest, tree planting, blasting near caves, and any activity that could change cave temperatures and drainage patterns.

Scenic Resources

"The Santa Fe NF is the most beautiful place on Earth."

"It is the backdrop of my home, the mountains in the distance."

(Public comments during the Assessment, spring 2014)

The landscapes of the Santa Fe NF have a wide variety of features providing for spectacular scenery in the Southwest. People are drawn to the forest for its diversity of scenic features including higher-elevation spruce-fir forests, brilliant gold aspen during autumn, lush high mountain meadows filled with wildflowers, dramatic landforms with vibrant colors, breathtaking red rock canyons and cliffs, sandstone bluffs, and mountain peaks. The inspiring mountain scenery, cool mountain air, and flowing waters provide relief from and contrast to the surrounding desert landscape. The forest offers dark night skies and provides the backdrop to many communities and homes with its variety of scenic settings with mesas, canyons, and peaks rising from deserts, meadows, and grasslands. The forest also has many prehistoric and historic sites, adding richness to the character and culture.

Research shows there is a high degree of public agreement regarding scenic preferences and people tend to value most highly the more visually attractive and natural-appearing landscape. Scenic characteristics are important in creating a sense of place for local residents and visitors alike, and they provide a sense of attachment and opportunities to connect with nature. Scenery is the backdrop and the setting for the entire Santa Fe NF, and it largely contributes to the experiences people have and seek when visiting the forest. All activities forest visitors experience are performed in an environment influenced by the surrounding scenic character.

Scenery is the arrangement of the natural elements of the landscape, along with components of the built environment. Scenic character is the set of physical, biological, and cultural features that give an area its scenic identity and contribute to its sense of place. All landscapes have definable scenic character attributes. In most national forest settings, scenic character attributes encompass both social and ecological elements, including landform, vegetative patterns, water characteristics, recreation opportunities, and cultural features. Combinations of these attributes define scenic character and embody the "image of an area." Buildings, structures, and other human alterations are considered a valuable aspect of scenic integrity when these features add to the sense of place or reflect the cultural legacy of an area.

Lands on the Santa Fe NF encompass designated wilderness including the Pecos, San Pedro Parks, Dome, and the Chama River Canyon, which provide for distinctive scenic landscape features and unaltered, natural scenic character. There are scenic and historic byways, providing visitors with exceptional views of the forest. Scenery is an outstandingly remarkable value for the forest's three designated wild and scenic rivers: East Fork of the Jemez River, Rio Chama, and Pecos River. And Jemez National Recreation Area provides outstanding scenery and recreation opportunities in a setting of dramatic landscapes with breathtaking views of sheer cliff faces, pock-marked tuff exposures, flat-topped mesas, and lush canyon bottoms. The outstanding scenery is one of the main resources drawing visitors to the Jemez National Recreation Area each year.

The Santa Fe NF uses the Forest Service Scenery Management System to determine the importance of scenery and identify scenic resources as they relate to people. Scenic integrity measures the degree to which the scenic character attributes are intact. Scenic integrity objectives are defined by degrees or levels of alteration from the existing scenic character and the intent is to achieve the highest scenic integrity possible and move toward the desired conditions (table 3).

As with all desired conditions, projects implemented under the forest plan are designed to maintain or move toward desired conditions (see Contents of a Forest Plan in Chapter 1). Due to the forest-wide scale of mapping for SIOs, some inconsistencies may be present. Examples of this are existing features with long-term impacts that will not achieve the desired SIO in the life of the forest plan (e.g., roads or trails, power lines, recreation facilities, pipelines, utility corridors, etc.), or geospatial data inconsistencies, especially along SIO boundaries. Updates to improve map accuracy by resolving these inconsistencies would be administrative changes to the map.

Table 3. Scenery Management System scenery integrity objectives and how they relate to public perceptions of scenery

Scenic Integrity Objective	Public Perceptions of Scenery
Very high	Unaltered; scenic character is intact; naturally evolving
High	Appears unaltered; alterations to scenic character may be present but are not evident; naturally appearing
Moderate	Slightly altered; alterations are subordinate to scenic character being viewed (scenic character is dominant, not the alteration); relatively naturally appearing
Low	Moderately altered; alterations begin to dominate the valued scenic character being viewed.

The forest is divided into levels of desired scenic integrity: very high, high, moderate, and low. These levels set objectives for the amount of variation from the existing scenic character that is permissible within the scenic integrity level.

Aesthetic and scenic values of the Santa Fe NF contribute to the attractiveness of the forest and the general quality of life for residents. Residents and visitors experience a particular “Sense of Place,” a cultural ecosystem service that partially depends on the scenic backdrop the forest provides for many communities in northern New Mexico.

Desired Conditions for Scenic Resources **(FW-SCENIC-DC)**

1 The forest contains a variety of ecologically sound, resilient, and visually appealing forest landscapes that sustain scenic character in ways that contribute to visitors’ sense of place and connection with nature.

2 The forest appears predominantly natural and includes cultural landscapes valued by forest users and local communities for their scenic and traditional values.

3 High-quality scenery dominates the landscape in areas the public values highly for scenery (such as scenic byways, major roads and trails, developed recreation sites, backcountry areas, and high scenic integrity areas such as wildernesses, wild and scenic rivers, and inventoried roadless areas).

4 Scenery reflects ecosystem diversity, enhances recreation settings, and contributes to the quality of life for local residents and communities as well as forest visitors.

5 Scenery is enhanced or maintained to have long-term resilience to changing conditions while supporting ecological, social, and economic sustainability in the forest and the surrounding landscapes.

6 Scenic integrity objectives serve as the desired conditions for scenery (see Appendix A, Fig. 8-west and Fig. 8-east).

Guidelines for Scenic Resources **(FW-SCENIC-G)**

1 Constructed features, facilities, and management activities should blend with the natural-appearing landscape. The concepts of form, line, color, texture, and pattern common to the desired scenic character being viewed should be applied during project planning and design.

2 Management activities should minimize visual disturbances and be consistent with or move the area toward achieving scenic integrity objectives (as defined by the Scenic Integrity Objective map).

   a In areas with *very high* scenic integrity objectives, the scenic character should have only minor, if any, deviations. The areas should appear unaltered and the majority of the area should be dominated by ecological changes.

   b In areas with *high* scenic integrity objectives, the scenic character should appear intact but may include deviations that are not evident (e.g., completely repeat the scenic attributes of size, shape, form, line, color, texture, or patterns common to the scenic character).

   c In areas with *moderate* scenic integrity objectives, the scenic character may appear slightly altered. Management activities, human-made structures and facilities should not dominate the scenic character (e.g., repeat the scenic attributes of size, shape, form, line, color, texture, or patterns common to the scenic character).

   d In areas with *low* scenic integrity objectives, the scenic character may appear moderately altered. Management activities including human-made structures and facilities may begin to dominate the scenic character, but use scenic attributes to blend into the landscape (e.g., repeat the scenic attributes of size, shape, form, line, color, texture, or patterns common to the scenic character).

3 Management activities that result in short-term impacts inconsistent with the scenic integrity objectives should achieve the scenic integrity objectives over the long term. Short-term and long-term timeframes should be defined during site specific project planning.

4 Projects should include mitigation measures to address impacts to scenic resources.

5 Effects to scenery from prescribed fire should be considered during project planning and implementation. Efforts should be made to minimize high-intensity fire along areas valued highly by the public for scenery (as defined by concern level 1 travelways and use areas in the Scenery Management System), unless necessary to meet management objectives or ensure public safety.

Management Approaches for Scenic Resources **(FW-SCENIC-MA)**

1. Cooperate with other entities, such as the New Mexico Department of Transportation, tribal and local governments, and commercial and private entities to protect scenic integrity on and adjacent to the national forest, including along scenic byways.
2. Consider developing public education opportunities and information about the importance and impacts of scenery.

3. Consider providing the Scenery Management Inventory and Scenic Integrity Objective map to neighboring land management agencies for integration into projects and plans. These maps can be provided to others as interest is expressed for them.
4. Consider best environmental design practices to advance environmentally sustainable design solutions (e.g., Sustainable Recreation Site Design Guide).
5. Consider using the Forest Service Built Environment Image Guide in construction or reconstruction of Forest Service facilities to ensure consistency with the scenic character of the Southwestern Region.
6. Set priorities for scenic integrity rehabilitation considering the following:
    - Foreground (within 300 feet to 0.5 mile) of high public use areas has the highest priority;
    - Amount of deviation from the scenic integrity objectives;
    - Length of time it would take natural processes to reduce the visual impacts so that they meet the scenic integrity objectives;
    - Length of time it will take rehabilitation measures to meet the scenic integrity objectives;
    - Benefits to other resource management objectives to accomplish rehabilitation;
    - Restoration of scenic integrity in areas where it has been negatively impacted as other project work is accomplished or funds are available; and
    - Where existing scenic integrity is lower than the scenic integrity map.
7. Prior to vegetation work in developed recreation sites or administrative facilities, consider developing vegetation management plans that outline activities to sustain the desired scenic character and key visual elements over time.
8. Consider the following types of activities to enhance scenic resources; restore grasslands and aspen, decommission or rehabilitate unneeded and unauthorized system roads and routes, remove unnecessary fences, and paint facilities along scenic byways.

Chapter 3. Designated and Management Area Plan Components

As a collection of diverse locations with different meanings and needs, the Santa Fe NF includes several areas and places that require different management direction than the overall forestwide direction provided in chapter 2. Plan components in this chapter may differ from forestwide guidance by:

- Constraining an activity where forestwide direction does not;
- Constraining an activity to a greater degree than forestwide direction; or
- Providing for an exception to forestwide direction, when forestwide direction is in conflict with the management emphasis of the management area.

Within the boundaries of any area addressed in this chapter, direction provided here takes precedence over forestwide direction. Where specific direction is silent here, but exists in forestwide plan components, the forestwide direction applies.

This chapter covers two types of areas—Designated Areas and Management Areas.

Designated Areas

The Santa Fe NF has areas that contain special, exceptional, or unique values that provide important ecosystem services. Some of these areas meet the criteria to be considered special places and become designated areas:

> *An area or feature identified and managed to maintain its unique special character or purpose.*

Designated areas may be statutorily designated by Congress or administratively designated by authorities such as the Regional Forester, Secretary of Agriculture, or Forest Service Chief. Once established, the designation continues until a subsequent decision by the appropriate authority removes the designation.

Designated areas are not only managed to forest standards, but also must be managed to additional standards contingent as part of their designation. Depending on the type of designation, these areas may be managed primarily for human recreation interests, to provide for unhindered ecosystem processes with only low-technology recreation, or managed for the long-term unfolding of ecological changes, providing a critical education benefit as system baselines.

Overall, designated areas can contribute to the cumulative value of the various ecosystem services the Santa Fe NF provides. Designated areas contribute to cultural ecosystem services by providing recreation opportunities and connecting people to their natural and cultural heritage. They can be attractions for visitors, and as a result, provide supporting ecosystem services through economic benefits such as increased employment opportunities and supporting small businesses to surrounding communities. Undeveloped areas with protections associated with their designation provide important supporting and regulatory ecosystem services for conservation of habitats and connectivity, biodiversity, and climate change adaptation. Finally, designated areas provide

regulating ecosystem services by preserving intact natural systems and their individual components.

The designated areas within the Santa Fe NF include:

- Four wilderness areas (figure 4-west and figure 4-east, pages 164–165)
- Fifty-four individually named inventoried roadless areas (IRAs) (figure 4-west and figure 4-east, pages 164–165)
- Two research natural areas (figure 4-west and figure 4-east, pages 164–165)
- Three wild and scenic rivers (figure 4-west and figure 4-east, pages 164–165)
- The Jemez National Recreational Area (figure 4-west, page 164)
- One wild horse territory (figure 4-west, page 164)
- Five significant caves (not disclosed on maps as per the Federal Caves Resources Protection Act of 1988)
- One national scenic trail (figure 5, page 183)
- Three national historic trails (figure 5, page 183)
- Two national recreation trails (figure 5, page 183)
- Six nationally designated scenic byways (figure 5, page 183)
- Three critical habitats for federally threatened and endangered species[20]

All Designated Areas

Desired Condition for All Designated Areas **(DA-ALLDA-DC)**

1	Designated areas in the forest retain the unique or special character and purpose for which they were designated.

Guidelines for All Designated Areas **(DA-ALLDA-G)**

1	Within designated areas, footprints of ground-disturbing fire-suppression activities should be as small as possible or located where ground disturbance has previously occurred.
2	Where designated areas overlap with each other or other management areas, the measures that restrict the ability to alter the landscape the most should be followed.

[20]Critical habitats and their management are identified in documentation from USFWS (e.g., species' recovery plan), and therefore, is not included in the forest plan. Also see FW-ATRISK-G2.

Wilderness Areas

In 1964, Congress acknowledged the immediate and lasting benefits of wild places by passing legislation that permanently protected some of America's most natural and undisturbed lands. The Wilderness Act established the National Wilderness Preservation System ". . . to secure for the American people of present and future generations the benefits of an enduring resource of wilderness."

The Wilderness Act sets forth guidelines for the management of wilderness areas by maintaining four attributes used to describe wilderness character:

- untrammeled;
- naturalness;
- undeveloped; and
- outstanding opportunities for solitude or primitive and unconfined recreation.

As such, designated wilderness areas provide places where natural processes dominate and the impacts of people are minimized. Motorized and mechanized uses such as motorized vehicles, heavy machinery (such as feller bunchers or excavators), chainsaws, mountain bikes, wheelbarrows, and drones are not allowed in wilderness areas to protect these values. Wilderness areas are typically large, offering people the opportunity to escape from civilization and experience rugged and unaltered natural elements that can sometimes involve a high level of unregulated risk.

The Wilderness Stewardship Performance was introduced in 2015 to manage wilderness attributes using seven categories that can be selected for each wilderness area: natural quality of wilderness character; undeveloped quality of wilderness character; untrammeled quality of wilderness character; outstanding opportunities for solitude or primitive and unconfirmed recreation quality of wilderness character; other features of value quality of wilderness character; special provisions; and administration.

Designated wilderness areas offer abundant ecosystem services. Their often pristine condition and minimal human impacts provide for excellent supporting ecosystem services such as nutrient and water cycling; biodiversity; and regulating ecosystem services such as water filtration, air quality protection, and climate change adaptation. Hunting and foraging can occur in a designated wilderness, allowing for provisioning ecosystem services such as food. Wilderness areas house many headwaters and provide high-quality water to the natural systems and communities below, another provisioning ecosystem service. Designated wilderness areas also provide abundant cultural ecosystem services in the form of recreation, opportunities to connect with nature, baselines on unhindered ecosystem processes for ecological research, and the preservation of cultural traditions and historical features.

The Santa Fe NF manages four designated wilderness areas, comprising around 291,669 acres, or 18.7 percent of the forest (see figure 4-west and figure 4-east). Two of the wilderness areas are completely managed by the Santa Fe NF and the other two have shared management with the Carson NF.

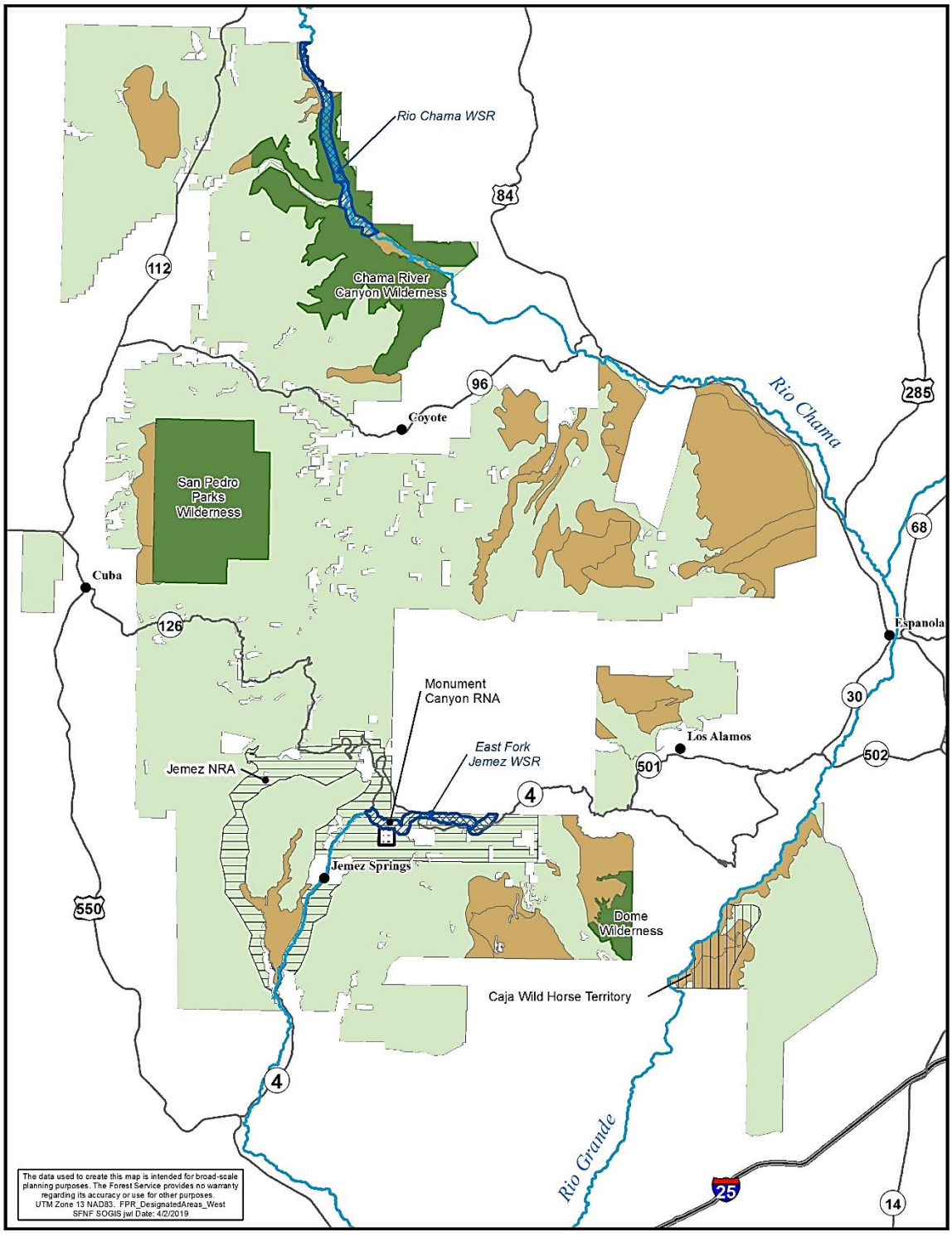


Figure 4-west. Designated areas for the western half of the Santa Fe NF, from Cuba to Española. For legend, see figure 3-east.

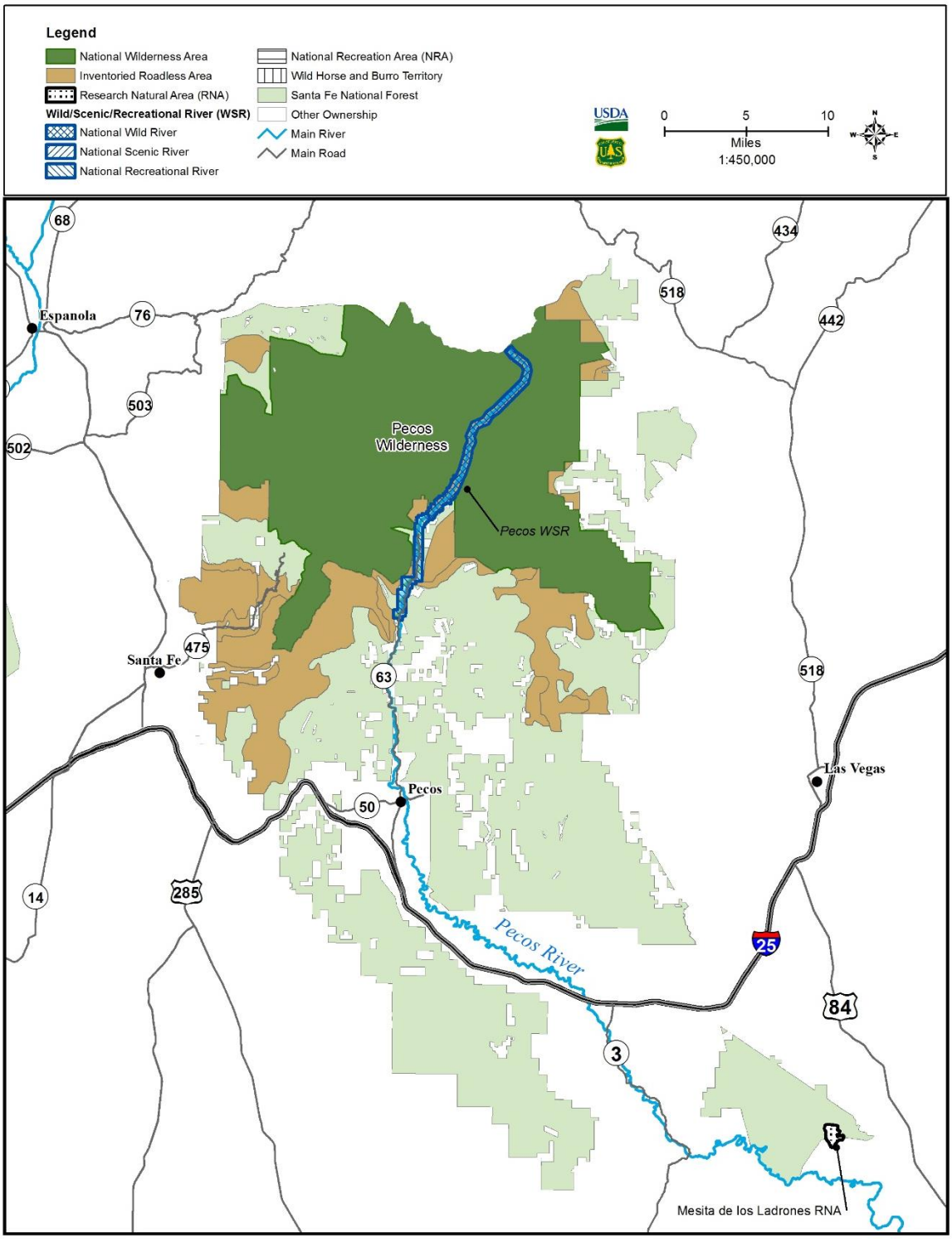


Figure 4-east. Designated areas for the eastern half of Santa Fe NF, from Española to Las Vegas

Chama River Canyon Wilderness

Designated in 1978, the Chama River Canyon Wilderness encompasses 50,300 acres (2,900 acres on the Carson NF) in the Coyote Ranger District. The wilderness offers outstanding opportunities for primitive recreation, including backpacking, dispersed camping, and day hiking. Varying canyon elevations also provide a wide range of vegetation, from low-lying piñon-juniper woodland to ponderosa pine and fir. Between 70 and 80 different bird varieties can be found in the Chama River Canyon. Raptors, hawks, and owls perch along the canyon walls and surrounding trees. Trout often flourish in the river, and onshore residents include mule deer, black bears, elk, coyotes, and mountain lions.

For the most part, the Chama River Canyon Wilderness is lightly used; trail access is poor above the canyon that borders the riverbanks. The Rio Chama Wild and Scenic River corridor almost bisects the wilderness. Only the northern portion flows within the wilderness. The southern portion of the river flows outside of the wilderness and has heavy use from both the public and outfitters and guides using the river corridor for overnight trips. The Continental Divide National Scenic Trail crosses through the Chama River Canyon Wilderness to the Carson NF. Wilderness Stewardship Performance elements that are the areas of focus and improvement in the Rio Chama include special provisions (specifically, livestock grazing) and administration (specifically, workforce capacity).

San Pedro Parks Wilderness

San Pedro Parks Wilderness began as a primitive area and became the San Pedro Parks Wilderness through the 1964 Wilderness Act. This wilderness is in both the Cuba and Coyote Ranger Districts. Although the elevation averages 10,000 feet above sea level, San Pedro Parks Wilderness is known for high, moist, rolling mountaintops with numerous meadows and large grassy “parks.” Clear streams wander through the forest openings and are usually abundant with trout. Frequent summer rainfall enables meadows to flourish with bluegrass, oat grass, sedge, rush, and Rocky Mountain iris, only to be covered with snow in November. The Continental Divide National Scenic Trail crosses through the San Pedro Parks Wilderness from Cuba, New Mexico, to the Carson NF. The culturally important Nacimiento Ditch (acequia) and San Gregorio Reservoir can be found at the southern edge of the wilderness and pre-date its establishment by Congress.

The San Pedro Parks Wilderness is located just outside the Albuquerque metro area, and sees considerable use from the population, because the area is easy to access. Wilderness Stewardship Performance elements that need increased attention and improvement in the San Pedro Parks Wilderness include natural quality (specifically invasive species), untrammeled quality (specifically from agency management actions), and special provisions (specifically livestock grazing).

Dome Wilderness

Designated in 1980, the Dome Wilderness covers 5,200 acres and is in the Jemez Ranger District. The Dome Fire, in the 1990s, and the Las Conchas Fire, in 2011, burned and then re-burned the majority of the wilderness. The Bandelier Wilderness (part of Bandelier National Park) borders the Dome Wilderness to the east. There are primitive canyon lands and prehistoric ruins in the wilderness. Elevations peak at 8,200 feet, then drop to 5,800 feet at Sanchez Canyon.

Although it is near the cities of Santa Fe and Los Alamos, the Dome Wilderness sees a low level of use, probably as a result of impacts from multiple fires over the last few decades to vegetation, roads, and trails (Dome, Cerro Grande, and Las Conchas). Wilderness Stewardship Performance

elements that need further attention include natural quality (specifically invasive species and air quality), untrammeled quality (specifically agency management actions), and other features of value (specifically cultural resources).

Pecos Wilderness

In 1964, Congress designated more than 167,000 acres as the Pecos Wilderness. In 1980, an additional 55,000 acres were added, bringing the total to just under 222,000 acres. The wilderness spans two national forests: just under 197,000 acres in the Española, Pecos, and Las Vegas Ranger Districts on the Santa Fe, and just over 25,000 acres on the Carson. Deep and narrow canyons, long and broad mesa tops, heavily forested slopes, and rugged ridges with peaks above the timberline characterize the Sangre de Cristo Mountains of the Pecos Wilderness. This small mountain chain comprises the extreme southern extent of the Rocky Mountains. The scenery varies from 100-foot-drop waterfalls and crumbled talus slopes to dramatic rock cliffs, towering peaks, and wildflower meadows.

Effects of livestock grazing, fire, and trail conditions are the issues dominating management of the Pecos Wilderness. Wilderness Stewardship Performance elements that need the most attention include untrammeled quality (specifically agency management actions) and special provisions (specifically livestock grazing).

Desired Conditions for Wilderness Areas **(DA-WILD-DC)**

1 Designated wilderness areas exhibit wilderness character.

- a Wilderness represents an environment that is essentially an unmodified and natural landscape. Constructed features exist only when they reflect the historic and cultural landscape, when they are the minimum necessary for administration of the area as wilderness, or for the protection of resources.
- b Natural processes (e.g., insects and disease and fires) function within their natural ecological role.
- c Wilderness provides recreation opportunities where social encounters are infrequent and occur only with individuals or small groups, so there are opportunities for solitude. Visitors experience self-reliance, challenge, and risk while enjoying freedom to pursue non-motorized or mechanized activities with only the regulation necessary to protect wilderness character.

2 Designated wilderness provides ecosystem services such as clean air and water, enhancing wildlife habitat, primitive recreation opportunities, and other qualities of wilderness character.

Objective for Wilderness Areas **(DA-WILD-O)**

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

Standards for Wilderness Areas **(DA-WILD-S)**

1 In designated wilderness, a single group must have no more than 15 persons and 15 livestock permitted, unless otherwise noted in its management plan. Exceptions may include special-use permits, grazing permits, formal agreements, emergency services, and management activities for maintaining wilderness character.

2 Research conducted in wilderness must not adversely affect wilderness character.

3 Nonnative or invasive species must not be introduced into any wilderness area unless for fire recovery purposes, or to maintain the pre-existing sport fish populations in San Gregorio Reservoir.

4 Outfitter-guide activities in wilderness must include appropriate wilderness practices, such as Leave No Trace principles, and incorporate awareness for wilderness values in their interaction with clients and others.

5 A Minimum Requirements Analysis must be utilized when considering nonconforming or prohibited uses in designated wilderness.

6 Planned ignitions in wilderness areas must not be justified for primary purposes of improving wildlife habitat, maintaining vegetation types, improving forage production, or enhancing other resource values, although these additional effects may result (FSM 2324). Planned ignitions may be used to reduce the risks and consequences of wildfire within wilderness or escaping from wilderness.

Guidelines for Wilderness Areas **(DA-WILD-G)**

1 Fire operations within wilderness should minimize effects to wilderness character (e.g., minimum impact suppression techniques and the management of fire for resource benefit). Management activities should be consistent with the scenic integrity objective of “very high” in designated wilderness.

2 To protect wilderness character, signage in wilderness should be limited to those essential for resource protection and user safety.

3 Intervention in natural processes through management actions should only occur where this would move the area toward desired conditions, preserve wilderness character, protect public health and safety within and adjacent to wilderness, uphold other Federal laws and regulations, or conform with a valid existing right.

4 Nonnative, invasive species should be treated using methods and in a manner consistent with wilderness character to allow natural processes to predominate in designated wilderness.

5 New trails constructed or designated in wilderness should be designed, built, and maintained as minimally to moderately developed (trail classes 1 or 2).

Management Approaches for Wilderness Areas **(DA-WILD-MA)**

1. Collaborate with local partners, volunteers, Adopt-a-Trail organizations, and other entities to maintain wilderness, including trails maintenance and construction.
2. Coordinate with the New Mexico Department of Game and Fish on management of wildlife within wilderness using techniques consistent with preserving wilderness character.
3. Wilderness management is guided by the elements outlined in the Forest Service's Wilderness Stewardship Performance or other current guidance. This framework tracks how well the wilderness character is being preserved through measuring progress in 10 elements selected by managers for each wilderness from a suite of possible options (e.g., management of fire, range, and cultural resources).
4. Consider adaptive management and corrective measures if overuse causes unacceptable resource damage or unacceptable loss of opportunities for solitude. Use proactive approaches in identifying and addressing visitor use management challenges before effects to resources become unacceptable.
5. Prioritize the decommissioning, realignment, or reconstruction of trails in designated wilderness areas based on need, the amount of use it receives, and potential impacts on wilderness character and recreation opportunities.
6. Consider using methods to prevent unauthorized use in wilderness such as education, law enforcement, barriers, road closures, and trail design.
7. Consider dispatching a Resource Advisor-Fire Line (REAF) or Resource Advisor (READ) with a specialized knowledge of wilderness, or wilderness program specialist in the absence of a wilderness REAF or READ, to fires threatening wilderness.
8. Consider using interpretation and education to encourage visitors to adopt techniques, equipment, and ethics specific to wilderness.
9. Consider educating boaters on relevant safety and resource protection regulations before they enter the Chama River Canyon Wilderness. Post these regulations at river access points and include them in outfitter-guide special-use authorizations.
10. Consider using news releases, postings, permit issuance, and individual visitor contacts to inform visitors of areas of concentrated resource damage and use restrictions.
11. Consider rehabilitating human-caused disturbed areas (e.g., compacted sites) that are inconsistent with maintaining the natural appearance component of wilderness character.
12. Consider reintroducing extirpated (locally extinct) or restoring populations of native species when consistent with ecological conditions and social values.
13. Consider clearly identifying wilderness boundaries through signage at official entry points and needed locations (such as informal access points), with features such as trail maps, boundary markers, and consistent signage.
14. Consider removing non-conforming structures from wilderness that are no longer in use and do not meet the desired conditions.

Inventoried Roadless Areas (IRAs)

Inventoried roadless areas (IRAs) were identified in the 2001 Roadless Area Conservation Rule (Special Areas; Roadless Area Conservation; Final Rule, 66 Fed. Reg. 3243 (January 12, 2001)). IRAs are characterized by nine values or features: (1) high quality or undisturbed soil, water, and air; (2) sources of public drinking water; (3) diversity of plant and animal communities; (4) habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; (5) primitive, semi-primitive non-motorized, and semi-primitive motorized classes of dispersed recreation; (6) reference landscapes; (7) natural-appearing landscapes with high scenic quality; (8) traditional cultural properties and sacred sites, and (9) other locally identified unique characteristics.

Road construction, reconstruction, and timber harvest activities are limited in these areas to sustain their social and ecological roadless characteristics. These activities were selected because they commonly occur on forests and grasslands across the Nation, have the greatest likelihood of altering landscapes, cause significant landscape fragmentation, and result in immediate and long-term loss of roadless characteristics (USDA Forest Service 2000). Activities proposed in IRAs must comply with the 2001 Roadless Area Conservation Rule, and additional review processes at regional or national levels are required for projects involving any of these activities.

In an increasingly developed landscape, IRAs provide large unfragmented tracts of land. As such, undisturbed landscapes that are important to biological diversity are a supporting ecosystem service of IRAs. They provide provisioning ecosystem services such as clean drinking water and regulating ecosystem services such as serving as bulwarks against the spread of nonnative invasive plant species. Opportunities for dispersed outdoor recreation, serving as reference areas for study and research, and their high scenic quality are cultural ecosystem services of IRAs.

The Santa Fe NF manages 54 IRAs (see figure 4-west and figure 4-east) totaling about 241,400 acres. The largest IRA is the Thompson Peak IRA with 32,979 acres, and the smallest is the Sparks Creek IRA with 80 acres. IRAs are found in every ranger district of the forest.

Desired Conditions for Inventoried Roadless Areas **(DA-IRA-DC)**

1 Inventoried roadless areas (IRAs) encompass large, relatively undisturbed and unfragmented landscapes that function as biological strongholds for populations of threatened and endangered species. They serve as safeguards against the spread of invasive plant species and provide reference areas for study and research.

2 In IRAs, ecosystems are intact and function to provide a full range of ecosystem services.

3 IRAs appear natural, have high scenic quality, and provide opportunities for primitive recreation and solitude.

Guidelines for Inventoried Roadless Areas **(DA-IRA-G)**

1	IRAs should be managed for primitive, semi-primitive non-motorized, and semi-primitive motorized recreation opportunity settings (ROS).
2	Management activities should be consistent with the scenic integrity objective of high.

Management Approach for Inventoried Roadless Areas **(DA-IRA-MA)**

1. Prioritize roads in IRAs for road decommissioning.

Research Natural Areas

Research natural areas (RNAs) are administratively designated by the Regional Forester and the Research Station Director, and are managed to maintain the natural features for which they were established. These features could include:

- High-quality examples of widespread ecosystems,
- Unique ecosystems or ecological features, or
- Rare or sensitive species of plants and animals and their habitat.

Because of the emphasis on natural conditions, RNAs are excellent areas for studying ecosystems or their component parts, and for monitoring succession and other long-term ecological changes. Non-manipulative research and monitoring activities are encouraged in RNAs, and can be compared with manipulative studies conducted in similar areas outside the RNAs. The Forest Service RNA system was initiated in 1927. By 1977, 122 RNAs were established on NFS lands; currently, over 430 RNAs cover more than 500,000 acres.

RNAs provide supporting ecosystem services by helping protect biological diversity at genetic species and ecosystem scales, which can also be a regulating ecosystem service. As ecosystems in relatively pristine condition, they are managed primarily for their natural ecological process, also a regulating ecosystem service. Their unique undisturbed qualities act as representative naturally functioning ecosystems and provide cultural ecosystem services such as research and education.

There are two established RNAs on the Santa Fe NF: Monument Canyon and Mesita de los Ladrones (see figure 4-west and figure 4-east).

Monument Canyon Research Natural Area

The Monument Canyon RNA encompasses approximately 640 acres on the Jemez Ranger District. The area is on a trail from Jemez Springs to Upper Vallecitos. The Monument Canyon RNA was set aside to preserve in natural state a “typical area of western yellow pine (*Pinus ponderosa*) forest as found in northern New Mexico.” The stands of western yellow pine in this region differ from those of the Colorado Plateau in that they are denser and more evenly spaced, with trees of relatively small diameter.

Mesita de los Ladrones Research Natural Area

The Mesita de los Ladrones RNA totals approximately 500 acres of one-seed juniper (*Juniperus monosperma*) savannah in north-central New Mexico. The RNA is located in the Las Vegas Ranger District, in San Miguel County. Juniper savannah has been recognized as a significant open woodland community for protection and study in the RNA program. The forage value of the accompanying grass understory has resulted in few undisturbed or intact examples of this community type as a result of livestock grazing and management efforts to increase forage (such as chaining). Because it is an isolated butte with steep, 200- to 350-foot sides, Mesita de los Ladrones has a minimal history of grazing. The lack of disturbance has resulted in advanced stages of oneseed juniper savannah succession, and therefore, the area is a uniquely suitable representative of the ecosystem.

Desired Conditions for Research Natural Areas **(DA-RNA-DC)**

1 RNAs are natural-appearing and ecological processes (e.g., plant succession, fire, and insects and disease) function with limited human interference.

2 RNAs are areas for the study of ecosystems and ecological processes, including succession, and serve as baseline areas for measuring ecological change from disturbances or stressors like climate change.

Standards for Research Natural Areas **(DA-RNA-S)**

1 Surface occupancy for minerals, geothermal, or oil and gas development must not be allowed.

2 Vegetation manipulation or removal of forest products for commercial purposes and personal use (including firewood) must not be permitted or authorized, unless it is necessary to maintain the ecological process or the natural characteristics for which the RNA was designated.

3 New trail construction must not be permitted.

4 Special-use permits must not be issued, except for research that would not lead to long-term effects on the characteristics specific to the RNA.

5 Only non-motorized, day-use recreational activities are allowed in the Cañada Bonita (recommended) and the Mesita de los Ladrones RNAs. Motorized use on roads shown as open in the MVUM must be allowed in the Monument Canyon RNA.

6 New roads must not be constructed, and closed roads must not be opened.

7 Campfires must not be allowed.

8 New utility corridors must not be permitted or authorized.

Guideline for Research Natural Areas **(DA-RNA-G)**

1 Management activities should be consistent with the scenic integrity objective of the RNA.

Management Approaches for Research Natural Areas **(DA-RNA-MA)**

1. Collaborate with appropriate agencies and universities regarding scientific opportunities of RNAs.
2. Encourage partnerships and volunteers to provide onsite interpretation and monitoring for the RNAs.
3. Consider marking the boundary of the RNA and using kiosks to educate the public about the RNA purpose, permitted, and prohibited activities.

Wild and Scenic Rivers

The 1968 Wild and Scenic Rivers Act established a system for preserving outstanding free-flowing rivers. As defined in Section 1(b) of the act: "…certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

Wild and scenic rivers (WSR) are classified as either wild, scenic, or recreational rivers; each classification has different characteristics.

- Wild rivers are free from impoundments and generally inaccessible except by trail. The water and shorelines are essentially primitive and waters are unpolluted.
- Scenic rivers are free from impoundments, have shorelines or watershed that are still largely primitive, and have shorelines that are largely undeveloped but accessible in places by roads.
- Recreational rivers are readily accessible by road, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past.

The free-flowing character of WSRs is a regulating ecosystem service, providing water to downstream sources and natural river processes (e.g., flood plain connectivity and channel formation). Free-flowing water can also be a supporting ecosystem service in the form of water cycling and a provisioning ecosystem service in terms of fresh water. The specific outstandingly remarkable values (ORVs) related with each WSR can have different ecosystem services: Scenic, recreational, historic, and cultural ORVs are cultural ecosystem services, while fish, wildlife, and geologic features can contribute supporting ecosystem services.

The Santa Fe NF manages three designated WSRs (see figure 4-west and figure 4-east) with the following classifications:

- Rio Chama: wild 21.6 miles; scenic 3.0 miles; 4.0 miles of study river
- Pecos River: wild 13.5 miles; recreational 7.0 miles
- East Fork of the Jemez: wild 4.0 miles; recreational 2.0 miles; scenic 5.0 miles

Rio Chama Wild and Scenic River

The Rio Chama WSR is approximately 120 miles long, beginning in the southern San Juan Mountains of south-central Colorado, it joins the Rio Grande near Española, New Mexico. The river was designated as a State Scenic and Pastoral River in 1978, and as a Federal WSR in 1988. The designated portion includes 21.6 miles that begins just below the dam at El Vado Lake and travels south toward the Big Eddy takeout above Abiquiu Reservoir. Most of the river is classified as wild (21.6 miles total: 11.2 Bureau of Land Management, and 10.4 Forest Service), 3.0 miles are classified as scenic, and 4.0 miles are classified as a study river. The Rio Chama WSR has ORVs for scenery, recreation, fisheries, and wildlife.

The northern section of the Rio Chama WSR runs through the Chama River Canyon Wilderness and is difficult to access. In contrast, the Rio Chama WSR outside of the Wilderness receives a high amount of both day and overnight use including camping, fishing, and scenic driving. Float boating on the Rio Chama is the most popular use of the river and managed by permits issued by the

Bureau of Land Management for commercial and private overnight trips or the Santa Fe NF for commercial day use. A float down the river offers access to the outstanding scenery of brightly colored cliffs and fascinating badlands of the surrounding Rio Chama Wilderness. Many bird species that depend on the water and riparian vegetation can be spotted along the river corridor, which is also a flight path for bird migrations.

East Fork Jemez Wild and Scenic River

The East Fork Jemez River was designated as a WSR in 1990. The designated WSR begins at the boundary of the Valles Caldera National Preserve and extends south, ending at the confluence with San Antonio Creek. The first 2 miles of the river are classified as recreational, the next 4 miles are classified as wild, and the last 5 miles are classified as scenic. The East Fork Jemez WSR has ORVs for scenery, recreation, geology, ecology, fish, and wildlife.

As part of the congressionally designated Jemez National Recreation Area, the East Fork Jemez WSR is very popular for visitors and recreationists. Where accessible, the river is sought after for visiting Jemez Falls, fishing, and swimming in some of the larger pools. A large part of the designated WSR is less accessible with canyons, steep gradients, and numerous boulders. The river also provides important habitat for a high diversity of vegetation, some of which is rare, such as bunchberry dogwood and giant helleborine.

Pecos Wild and Scenic River

The Pecos WSR is about 20.5 miles long and runs through the Sangre de Cristo Mountains of northern New Mexico. It was designated in 1990. The 13.5-mile wild segment is entirely within the Pecos Wilderness, where it is only accessible by trail. Here, the water runs clear, unpolluted, and cold. Outside the Pecos Wilderness is the 7.0-mile recreational segment, which is more easily accessible, includes cabins and other modifications in places, and is paralleled by a road for most of its length. The ORVs include scenery, recreation, and cultural and historic values.

Trout fishing along this river is regionally and nationally renowned. The landscapes along the river are dramatic and include canyons, mountain meadows, and waterfalls. Cultural attributes are abundant and include pre-historic artifacts, remnants of Spanish prospecting from the 1600s, the mountain man “Beatty’s” cabin, cemeteries, and Civilian Conservation Corps campsites.

Desired Conditions for Designated Rivers **(DA-WSR-DC)**

1 Designated wild and scenic rivers are free-flowing, possess the ORVs for which they were designated, and classifications of wild and scenic river corridors are preserved.

2 The public has the opportunity for water-based recreation, yet the majority of the riparian zones remain largely undisturbed from long-term recreational impacts (e.g., camping and access points).

Standards for Designated Rivers **(DA-WSR-S)**

1 Management of designated wild, scenic, and recreational rivers must comply with the most recent version of their individual comprehensive river management plans (CRMP). The following CRMPs and any future versions must be incorporated by reference and are part of the forest plan, although best available science can be used in lieu of the comprehensive plan if the plan is out of date with science.

- a East Fork Jemez Wild and Scenic River Management Plan
- b Pecos Wild and Scenic River Management Plan
- c Rio Chama Management Plan

2 The classification (wild, scenic, or recreational) for Designated Wild and Scenic rivers must be maintained or enhanced when implementing projects.

3 Designated Wild and Scenic rivers must be managed to protect or enhance existing ORVs. Proposed water resources projects, including activities within the bed and banks and below the ordinary high water mark of the river, must require a free-flow analysis and cannot have a direct adverse impact on free flow.

4 Road and motorized trail access to rivers must be consistent with river classification, travel management direction, and the desired ROS classification.

5 Existing or new mining activity must minimize surface disturbance, sedimentation, pollution, and visual impairment.

6 Within designated wild segments, new structures must not be constructed, except to preserve or restore native fish populations, as long as those structures do not alter the free flow of the river.

7 Utility rights-of-way within designated recreational and scenic segments must only be permitted when there are no feasible alternative locations outside the WSR corridor.

8 Utility rights-of-way within designated wild segments must not be permitted.

Guidelines for Designated Rivers **(DA-WSR-G)**

1 Wild sections of the Rio Chama, Pecos, and East Fork of the Jemez Rivers should:

- a be kept free of impoundments;
- b meet or exceed State standards for water quality;
- c be accessible only by trail; and
- d have shorelines kept in an essentially primitive condition (e.g., essentially free of structures, diversion works, and modifications of the waterway such as rip-rapping and channelization).

2 Within scenic sections of the East Fork of the Jemez, the river should:

- a remain free of impoundments;
- b have largely primitive shorelines and shoreline development; and
- c be accessible by roads only at certain points.

3 When shorelines of recreational sections of the Rio Chama and Pecos Rivers are paralleled by roads, development, or resource management, the surrounding areas and waterways should be predominantly natural and riverine in appearance.

4 Mitigations should be implemented to protect and enhance ORVs, free-flowing characteristics, and riparian habitats from range management activities in the Rio Chama WSR corridor.

5 Expansion of structural improvements, outside of the bed and banks and above the ordinary high water mark of the river, in recreational and scenic segments (outside designated wilderness) should be allowed as long as they meet scenic integrity objectives, provide user access, or facilitate resource protection.

6 Unless otherwise specified in the CRMP, management activities should be consistent with the scenic integrity objectives of:
- a Very high in designated wild rivers,
- b High in designated scenic rivers, and
- c Moderate to high in designated recreational rivers.

7 Management activities should be consistent with the desired ROS classes of:
- a Primitive to semi-primitive non-motorized in designated wild rivers,
- b Primitive to semi-primitive non-motorized in designated wild rivers,
- c Semi-primitive-nonmotorized to semi-primitive motorized in designated scenic rivers, and
- d Semi-primitive to roaded natural in designated recreational rivers.

Management Approach for Designated Rivers **(DA-WSR-MA)**

1. Coordinate planning and management of the boating aspects of the Rio Chama with the Bureau of Land Management (BLM), in consultation with interested stakeholders, such as the Bureau of Reclamation; the Army Corps of Engineers; New Mexico Department of Game and Fish; and U.S. Fish and Wildlife Service.

Jemez National Recreation Area

The Jemez National Recreation Area (JNRA) was designated by Congress in 1993, and covers 57,650 acres, 48,300 of which are located in the Santa Fe NF[21] (see figure 4-west). The only national recreation area in the Southwestern Region, the JNRA is located in north-central New Mexico, within the Jemez Mountains of Sandoval County. The western boundary follows the Rio Guadalupe corridor, the southeastern portion consists of the Jemez River corridor and San Diego Canyon, and the northeastern portion follows the southern edge of the Valles Caldera National Preserve. Elevations range from around 5,800 feet above sea level along the lower Jemez River near Cañon to over 10,100 feet at Los Griegos (just north of Cerro Pelado). Two main river corridors flow through the area—the Rio Guadalupe and the Jemez Rivers.

With its close proximity to the Albuquerque metro area, the area is popular and receives many visitors each year. The Rio Guadalupe and Jemez River corridors receive the most recreational use within the JNRA, and the area as a whole receives a very high level of visitation relative to its size.

Ecosystem services supported by the JNRA are both cultural and supporting. Recreational opportunities are a major part of cultural ecosystem services in the area, and include an assortment of dispersed and developed activities. From a supporting ecosystem services standpoint, the JNRA promotes biodiversity. It contains habitat for many wildlife and plant species, including some listed as threatened, endangered, or sensitive. The management of these species is culturally valuable as well. Overall, the values listed in the Federal designation include recreational, ecological, cultural, religious, and wildlife resources.

Desired Conditions for Jemez National Recreation Area **(DA-JNRA-DC)**

1 The recreational, ecological, cultural, religious, and wildlife resource values for which the Jemez National Recreation Area (JNRA) was designated are maintained along with visitor access and use.

2 Recreational opportunities support the needs and expectations of the diverse population in the surrounding area (e.g., urban visitors, rural residents, youth, people with disabilities, aging populations, and traditional and cultural users).

Standards for Jemez National Recreation Area **(DA-JNRA-S)**

1 The area must be managed consistent with the most recent version of the JNRA Management Plan.

2 Mineral extraction must not occur within the JNRA, as it was withdrawn from all mineral entry.

3 Within the Jemez National Recreation Area, Stage 1 Fire Restrictions (e.g., fires outside developed sites are prohibited, smoking is prohibited) as described in the Southwest Interagency Fire Restrictions and Closure Master Operating Plan shall be enforced at all times.

[21] The remaining acres are on private land and not subject to guidance here or within the JNRA

Guideline for Jemez National Recreation Area **(DA-JNRA-G)**

1	Management practices should not threaten the recreational, ecological, cultural, religious, and wildlife resource values for which the JNRA was designated.

Management Approaches for Jemez National Recreation Area **(DA-JNRA-MA)**

1. Work with volunteer groups, partners, local governments, and adjacent landowners to:
   - protect the condition and character of the surrounding landscape, and
   - facilitate support that promotes 'Leave No Trace' principles and reduces user conflicts.

Wild Horse Territory (WHT)

The Wild Free-Roaming Horse and Burros Act of 1971, as amended by the Federal Land Policy and Management Act of 1976 and the Public Rangeland Improvement Act of 1978, directs the protection and management of wild horses and burros on public lands. The Forest Service, by authority of the Secretary of Agriculture, is responsible for managing the Nation's wild horses and burros on NFS lands. The Santa Fe NF has one active designated wild horse territory (WHT) (figure 4-west)—the Caja del Rio Wild Horse Territory. Two WHT and one Burro Territory on the Santa Fe NF have had their appropriate management level (AML) set to zero through the NEPA analysis process. Therefore, this plan only extends to the Caja del Rio WHT.

The Caja del Rio WHT consists of 8,728 acres of NFS lands in the Caja Plateau administered by the Española Ranger District. Vegetation is primarily steppe grasslands and piñon-juniper. Horses have frequented the area since at least 1934, but the herd history is not well known. Observations indicate the animals appear similar to quarter horses and were largely sorrel or bay in color. No herd supplementation or reduction has occurred since the herd was designated in 1971.

Management of WHTs are guided by individual management plans. Pursuant to the Wild Free-Roaming Horse and Burros Act of 1971, a census of wild horses and burros on NFS lands should be taken every 3 to 4 years to assess population size and growth rate, and genetic monitoring should be used to establish health of the population. Wild horse populations can double approximately every 5 years (18 percent recruitment rate), horses in excess of what the ecosystem can sustain should be periodically gathered and removed from WHTs.

Wild horses and burros are a social and cultural ecosystem service in the Santa Fe NF. The history of the Caja del Rio herd is tied to that of local communities, and many Americans from all backgrounds have an emotional attachment to wild horses as cultural symbols. WHTs help protect and preserve cultural traditions and values surrounding wild horses.

Desired Conditions for the Caja del Rio Wild Horse Territory (DA-WHT-DC)

1 A biologically sound and genetically viable horse population is supported by healthy ecosystems, essential ecological processes, and land stewardship activities, and reflects the diversity, quantity, quality, and capability of natural habitats in the forest.

2 Rangelands are resilient to disturbances, fluctuations, and extremes in the natural environment.

3 Forage, browse, and cover needs of wild horses, wildlife, and authorized livestock are available and are at or moving toward a healthy, persistent state relative to site potential.

Standard for the Caja del Rio Wild Horse Territory **(DA-WHT-S)**

1 Once a territory plan has been implemented, an AML has been established, and aerial monitoring shows that horse numbers exceed those set in the territory plan, humane methods must be used to gather animals.

Guideline for the Caja del Rio Wild Horse Territory **(DA-WHT-G)**

1	Once a territory plan has been implemented and an AML established, horse numbers should align with the appropriate management levels they describe.

Management Approaches for Caja del Rio Wild Horse Territory (DA-WHT-MA)

1. Consider developing partnerships with other Federal Government agencies such as the Bureau of Indian Affairs, Animal and Plant Health Inspection Service, Fish and Wildlife Service, the State of New Mexico, universities, cattle and range organizations, advocate organizations, federally recognized tribes, adjacent landowners, and grazing permittees.
2. Consider developing an AML and management plan, including coordinating with the BLM and the Pueblo of Cochiti.
3. Monitor horse numbers within active territories at least every 3 to 4 years.

Significant Caves

Significant caves are considered invaluable and irreplaceable parts of the Nation's natural heritage and in some cases, they are threatened due to improper use, increased recreational demand, urban spread, and a lack of specific statutory protection. Of the numerous caves and rock crevices throughout the varied landscapes in the Santa Fe NF, five are designated as significant in accordance with §290.3(e). These caves meet criteria in §290.3(c) or (d), which are based on geologic-mineralogic-paleontologic values; biota; cultural values; hydrologic values; and recreational, educational, or scientific values that the cave possesses.

The Federal Cave Resources Protection Act of 1988 (16 U.S.C. 4301-4309; 102 Stat. 4546) requires the Secretary of Agriculture to consider significant caves in the preparation of any land management plan and keep the locations of significant caves confidential unless it is determined that disclosure will not create a risk of harm, theft, or destruction to cave resources. Caves determined to be significant will be governed under provisions of the Federal Cave Resources Protection Act with an objective to secure, protect, and preserve significant caves for the perpetual use, enjoyment, and benefit of all people, and to foster increased cooperation and exchange of information with those who utilize caves for scientific, educational, or recreational purposes. Caves not determined significant will be managed under the standards and guidelines of the forest plan for non-significant caves (found under Energy, Minerals, and Caves), FSM 2372, FSM 2882.6 and 36-CFR; §261-Prohibitions.

Depending upon the criteria of each significant cave, they can provide supporting ecosystem services (geologic-mineralogic-paleontologic values or biota), regulating ecosystem services (hydrologic values), and cultural ecosystem services (cultural values; recreational, educational, or scientific values).

Desired Condition for Significant Caves **(DA-SIGCAVES-DC)**

1 Significant cave resources' aesthetic, cultural, and scientific values remain intact, and are protected from damage to provide for uses either by people (traditional cultural uses) or wildlife.

Management Approach for Significant Caves **(DA-SIGCAVES-MA)**

1. Consider measures to prevent human-caused changes in cave ecosystem, water, sediment, nutrient, chemical, airflow, humidity, or temperature regimes.

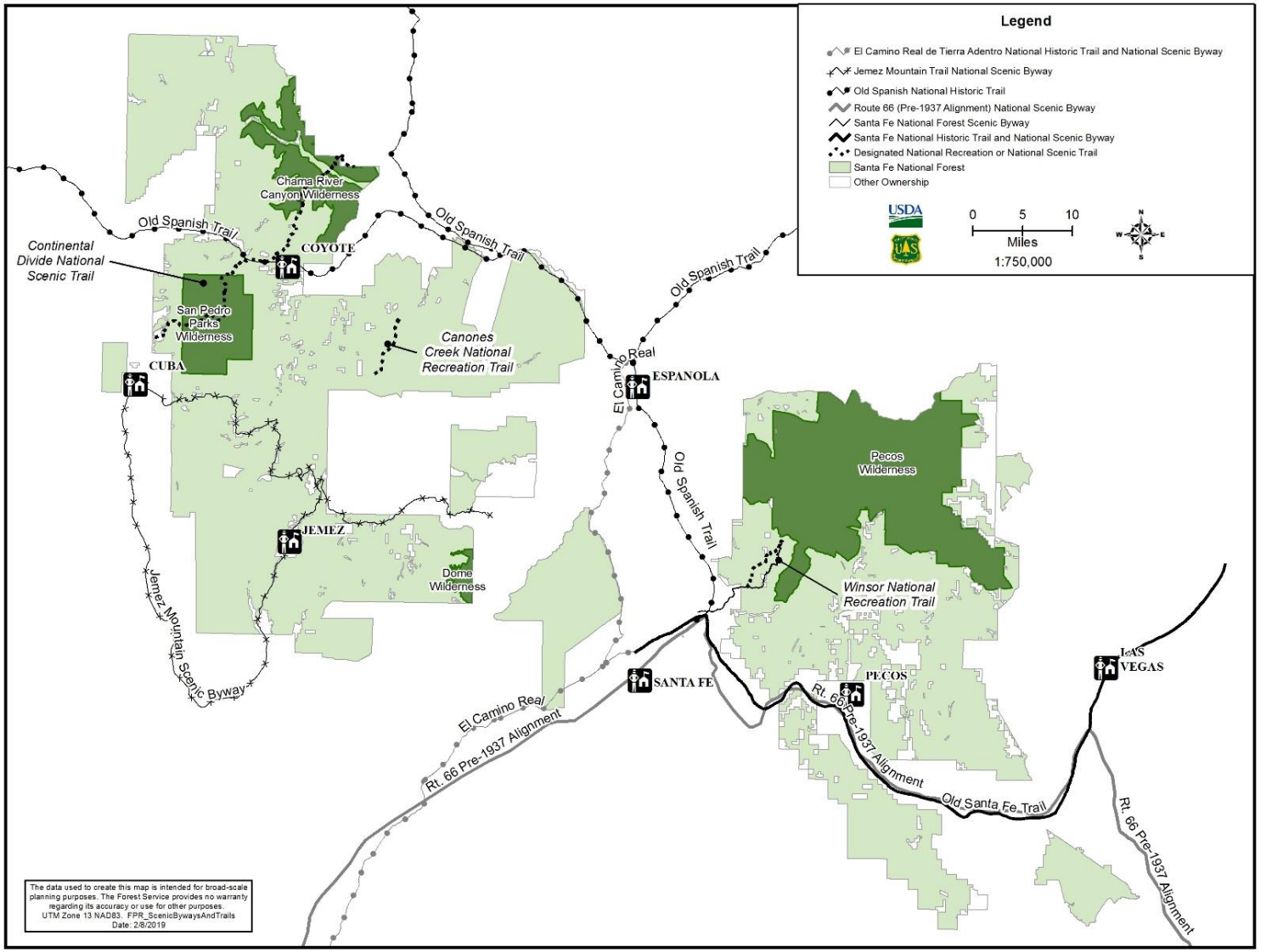


Figure 5. Designated national trails and national scenic byways on the Santa Fe NF

National Historic Trails, particularly the El Camino Real NHT and Old Spanish NHT, have multiple alignments. Some of the alignments pass through the Santa Fe NF and are shown in this map. However, not all alignments may be indicated here for ease of viewing this map. Please see the National Park Service for information and maps regarding all alignments related to NHT.

National Trails

The National Trails System Act of October 2, 1968 (16 U.S.C. 1241–1249), created a network of recreation, scenic and historic trails across the country in response to President Johnson's 1965 "Natural Beauty" message. The President called for a cooperatively developed and protected system of trails across America: "we can and should have an abundance of trails for walking, cycling, and horseback riding, in and close to our cities. In the backcountry we need to copy the great Appalachian Trail in all parts of America." The purpose of the National Trails System is to provide for the ever-increasing outdoor recreation needs of an expanding population and promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air outdoor areas and historic resources of the Nation.

The National Trails System Act is the primary guiding act for nationally designated trails. Congress designates national scenic and historic trails, but national recreation trails are designated by the Secretary of the Interior or the Secretary of Agriculture, who delegated it to Regional Foresters for NFS lands. National trails are managed cooperatively among multiple agencies and states in accordance with numerous requirements, which include the development of a trail comprehensive plan. A comprehensive plan is required for national scenic and national historic trails. These plans provide overall policy for management and administration of these congressionally designated areas.

The National Trail System supports a number of cultural ecosystem services. Trails provide for outdoor recreation needs; promote the enjoyment, appreciation, and preservation of outdoor areas and historic resources; and encourage public access and citizen involvement. Trails can also support rural communities through recreation-spending, which is another aspect of cultural ecosystem services.

The Santa Fe NF has one national scenic trail, three national historic trails, and two national recreation trails (see figure 5).

National Scenic Trail

Continental Divide National Scenic Trail

According to the National Trails System Act, national scenic trails "will be extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of nationally significant scenic, historic, natural, and cultural qualities of the area through which such trails may pass."

The Continental Divide National Scenic Trail (CDNST) was designated by an Act of Congress in 1978. It runs 3,100 miles between Mexico and Canada, traversing 20 national forests, 4 National Park Service units, 13 BLM field offices, and state and private lands in Montana, Idaho, Wyoming, Colorado, and New Mexico (USDA 2009). The CDNST is one of the highest, most rugged, and most spectacular trails in the United States, showcasing ecosystems as varied as the 14,270-foot summit of Gray's Peak, great coniferous forests, mountain meadows, remote valleys, and high-desert landscapes. In the Santa Fe NF, the trail passes through 42 miles of the Coyote and Cuba Ranger Districts, before entering the Carson NF in the north (figure 5).

The trail was established to provide high-quality scenic, primitive hiking, and horseback riding opportunities, and to conserve natural, historic, and cultural resources along the Continental Divide National Scenic Trail corridor. These traditional uses persist, joined by a growing diversity of

modern recreation. The CDNST is managed cooperatively among agencies and multiple partners, following the 2009 amended Comprehensive Plan (USDA 2009). The Forest Service's Region 2 has the administrative lead overall, while in New Mexico, the BLM maintains public information online.

Ecosystem services unique to the CDNST include cultural services such as providing for outdoor recreation and connection with the diverse cultural and natural landscapes existing along the spine of the Rocky Mountains. Cultural ecosystem services, as well as provisioning services like natural resources, are also supported under the purpose of the CDNST: "…to conserve natural, historic, and cultural resources along the CDNST corridor."

Desired Conditions for the Continental Divide National Scenic Trail **(DA-CDNST-DC)**

1 The CDNST is a well-defined trail in a highly scenic setting that provides for high-quality primitive hiking and horseback riding opportunities, and other compatible non-motorized trail activities. Significant scenic, natural, historic, and cultural resources along the CDNST's corridor are conserved.

2 Viewsheds from the CDNST have high scenic values. The CDNST provides visitors with expansive views of the natural landscapes along the Continental Divide. The foreground of the CDNST (up to 0.5 mile on either side[22]) is natural-appearing.

3 The CDNST has access points that provide various opportunities to select the type of terrain, scenery, and trail length (e.g., ranging from long-distance to day use) that best provide for compatible outdoor recreation experiences.

   a Wild and remote backcountry segments of the CDNST provide opportunities for solitude, immersion in natural landscapes, and primitive outdoor recreation.

   b Front-country and easily accessible trail segments complement local community interests and needs and help contribute to their sense of place.

4 Visitors are aware of the CDNST corridor and the nature and purposes of the trail designation.

5 Conflicts among users are rare and easily resolved.

6 The trail is well-maintained, signed, and passable. Alternate routes are made available in the case of temporary closures resulting from natural events, such as fire or flood, or land management activities.

Objective for the Continental Divide National Scenic Trail **(DA-CDNST-O)**

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

[22] The definition of "foreground" in the Scenery Management System is 0-0.5 mile, the detailed landscape generally found from the observer to 0.5 mile away (Agriculture Handbook 701, page 4-10). This is generally 0.5 mile on either side of the trail, unless topographic features (i.e., cliffs) block and reduce the visible distance from the trail (see Glossary for further information).

Standards for the Continental Divide National Scenic Trail **(DA-CDNST-S)**

1 Management of the CDNST must comply with the most recent version of the CDNST Comprehensive Plan. Best available science can be used in lieu of the comprehensive plan if the plan is out-of-date with science.

2 Motorized use shall not be allowed on newly constructed segments of the CDNST. Existing motorized use may continue on the CDNST (where it overlaps with existing roads or motorized trails).

3 Surface occupancy for geothermal energy leasing activities must not occur within the CDNST corridor.

4 Common variety mineral extraction (e.g., limestone, gravel, pumice) must not occur within the CDNST corridor.

5 Motorized events and motorized special-use permits must not be permitted or authorized on the CDNST.

Guidelines for the Continental Divide National Scenic Trail **(DA-CDNST-G)**

1 The corridor around the CDNST should be defined by either the foreground (0.5 mile on either side; see Appendix A, Fig. 10) or based on the Scenery Management System viewshed, which shows the landscape area visible from the trail based on topography.

2 To retain or promote the character for which the CDNST was designated, the corridor should be consistent with primitive or semi-primitive non-motorized desired ROS classes.

- a The corridor may intermittently pass through more developed settings.
- b The CDNST provides for a continuous route through predominately undeveloped settings.
- c New or relocated trail segments should be located primarily within these settings.
- d Road and motorized trail crossings and other signs of modern development should be avoided.

3 To protect or enhance the scenic qualities of the CDNST, management activities should be consistent with scenic integrity objectives of high or very high within the foreground viewshed of the trail (up to 0.5 mile either side).

4 If management activities result in short-term impacts to the scenic character along the CDNST, mitigation measures should be included (e.g., screening, feathering, and other scenery management techniques) to minimize visual impacts and achieve mapped scenic integrity objectives in the trail corridor.

5 To promote a non-motorized setting, the CDNST should not be permanently re-located onto routes open to motor vehicle use.

6 The minimum trail facilities necessary to accommodate the amount and types of use anticipated on any given segment along the CDNST should be provided to protect resource values and for health and safety (not for the purpose of promoting user comfort) to preserve or promote a natural-appearing setting.

7 To protect the CDNST's scenic values, new communication sites, utility corridors, and renewable energy sites developed under special-use authorizations should not be visually apparent within visible foreground (up to 0.5 mile) and should be visually subordinate in the middleground viewshed (0.5 to 4 miles).

8 Linear utilities and rights-of-way should be limited to a single crossing per special-use authorization of the CDNST unless additional crossings are documented as the only prudent and feasible alternative.

9 New temporary and permanent road or motorized trail construction across or adjacent to the CDNST should be avoided unless necessary for resource protection, access to private lands, or to protect public health and safety.

10 Except where the CDNST follows a road, the trail should not be used for landings (e.g., timber, slash, decking) or as a temporary road. Hauling or skidding along the trail itself should be allowed only when design features are used to minimize impacts to the trail infrastructure and:

   a where the CDNST is currently located on an open road, and

   b no other haul route or skid trail options are available.

11 Unplanned fires in the foreground (up to 0.5 mile) of the CDNST should be managed using minimum impact suppression tactics or other tactics appropriate for protecting CDNST values. Prescribed fires in the foreground of the trail should be managed to incorporate the values of the CDNST. Heavy equipment fireline construction within the CDNST corridor should not be allowed unless necessary for emergency protection of life and property.

12 Uses that could conflict with the nature and purpose of the CDNST should be prohibited when it is determined that the use would interfere with the nature and purpose of the trail.

Management Approaches for the Continental Divide National Scenic Trail **(DA-CDNST-MA)**

1. Work with volunteer groups; partners; Federal, State, Tribal, and local governments; and adjacent landowners to maintain CDNST corridors, the condition and character of the surrounding landscape, and to facilitate CDNST user support that promotes 'Leave No Trace' principles and reduces user conflict.

2. Consider working with partners to promote public education about the history, purpose, and benefits of the CDNST.

3. Consider ensuring that incident management teams are aware of the CDNST as a resource to be protected during wildfire suppression activities. Consider clearly identifying fire suppression rehabilitation and long-term recovery of the CDNST corridor as high priorities for incident management teams, burned area emergency response teams, and post-fire rehabilitation interdisciplinary teams.

4. Consider establishing appropriate visitor use levels for specific segments of the CDNST and taking appropriate actions if there is a trend away from the desired condition.

5. Consider evaluating proposed trail relocations or new trail segments (e.g., using methods such as the Optimal Location Review process for substantial trail locations) for the CDNST, including to locate the CDNST as close as possible to the geographic Continental Divide.

6. Consider identifying and pursuing opportunities to acquire lands or rights-of-way within or adjacent to the CDNST as they become available.
7. Consider providing consistent signage along the CDNST corridor at road crossings to adequately identify the trail and including interpretation at trailheads.
8. Consider using side and connecting trails to access points of interest or supplying points away from the CDNST.

National Historic Trails

National historic trails (NHT) were created through an amendment to the National Trails System Act in 1978. They are extended trails that follow the original routes of historically significant trails or roads, with the purpose of identifying and protecting the historic quality of the route and its remnants and artifacts. To qualify, a trail had to be: A route established by historic use; significant to the entire Nation as a result of that use; and possessing significant potential for recreational use or historic interest by the public due to historic interpretation and appreciation.[23]

Through multi-agency management, these NHTs are stewarded in concert with trail-specific comprehensive management plans put forth by the Federal administrator for these trails, and ongoing forest management efforts, to seamlessly protect unique cultural landscapes across jurisdictions.

NHTs in the Santa Fe provide cultural ecosystem services through recreational experiences that connect visitors to the past through ongoing management of trail access, maintenance, interpretation, and education. They also act to preserve important historical and cultural markers on the landscape, contributing to sense of place.

Segments of three NHTs traverse the Santa Fe NF: the El Camino Real del Tierra Adentro National Historic Trail, the Santa Fe National Historic Trail, and the Old Spanish National Historic Trail (see figure 5).

El Camino Real de Tierra Adentro National Historic Trail

The El Camino Real de Tierra Adentro, or the Royal Road of the Interior Lands, was added to the National Trails System in 2000—the result of long-term collaboration between land management agencies in both the United States and Mexico. It is one of the longest, oldest, and most historic trails in the Americas. El Camino Real de Tierra Adentro NHT runs more than 400 miles through New Mexico and Texas. Approximately 9.5 miles of the trail are located in the Santa Fe NF, passing through portions of the Española Ranger District, rising from the community of La Bajada, and paralleling the Santa Fe River Canyon (figure 5). The trail has been listed on the National Register of Historic Places in many areas of the forest, and 4.6 miles of the trail are considered high-potential routes, as wagon ruts from the original trail are viewable.

Historically, El Camino Real de Tiera Adentro was a 1,600-mile-long trade route between Mexico City, Mexico, and Ohkay Owingeh, New Mexico. It is the earliest European trade route between Zacatecas and the historic interior lands of Mexico, now modern-day New Mexico. For nearly 300 years (A.D. 1598 to 1885), the trail was the principal trade route that made possible the settlement, conquest, military occupation, and religious conversion of the borderlands. El Camino Real de Tierra Adentro represents a symbol of early cultural interaction between nations and multiple ethnic groups in the Southwest.

El Camino Real de Tierra Adentro NHT is jointly administered by the National Park Service and the Bureau of Land Management, who then collaborate with the Mexican government on trail management spanning the border. The goals set forth in the trail's comprehensive management

[23] https://www.fs.fed.us/recreation/programs/trails/nat_trails.shtml

plan are to provide for a high-quality visitor experience, coordinated interpretation and education, effective administration, and active resource protection.

Santa Fe National Historic Trail

In 1987, Congress and President Reagan added the route to the National Trails System. The Santa Fe NHT extends 1,203 miles across the Great Plains through Missouri, Kansas, Oklahoma, Colorado, and New Mexico. Approximately 8 miles of the Santa Fe NHT cross the Santa Fe NF (figure 5). The most traveled section of this trail lies between Glorieta Pass and the Santa Fe NF in the Pecos Ranger District. The remaining miles are smaller segments of the trail and secondary connector trails.

The identified period of significance for the Santa Fe NHT is from 1821 to 1880, when the trail played a critical role in the westward expansion of the United States between Franklin, Missouri, and Santa Fe, New Mexico. During the United States Territorial Period, beginning in 1848, the trail provided military support for trade caravans, settlers, and the construction of forts.

The Santa Fe Trail is administered by the National Park Service (NPS), in cooperation with state and local jurisdictions, interested groups, and private landowners. The 1990 Santa Fe NHT comprehensive management plan identified 194 high-potential sites, and 30 high-potential route segments consisting of intact wagon ruts, along the length of the trail. The 1990 Santa Fe comprehensive management plan focuses on the protection, historical interpretation, recreation use, and management of the trail corridor.

Old Spanish National Historic Trail

The Old Spanish NHT was designated by Congress and President George W. Bush in 2002. The 2,700-mile trail extends through New Mexico, Colorado, Utah, Nevada, and Arizona, ending in California. Approximately 23.5 miles of the trail cross the Española, Coyote, and Cuba Ranger Districts of the Santa Fe NF (see figure 5). Two routes included in the trail can be found in the forest: the Northern Route and the Armijo Route. The Northern Route follows U.S. Highway 84 north of Santa Fe, while the Armijo Route breaks from U.S. Highway 84 and continues west along State Highway 96.

Commercial use of the trail started in 1829, and supported commercial ventures for the next 20 years. It served as a route for immigrants and trade goods moving west to California. Use of the rugged trail declined with the start of the United States Territorial Period in 1848, as more passable trails became available.

The Old Spanish NHT is jointly administered by the Bureau of Land Management and the National Park Service. These two agencies co-authored the 2016 Old Spanish NHT Comprehensive Administration Strategy, which prioritizes resource identification, including protection, monitoring, and mapping resource inventories; and trail user experience, including interpretation, recreation, and health and safety.

Desired Conditions for National Historic Trails **(DA-NHT-DC)**

1 NHT segments in the forest follow routes of historic significance, within an intact cultural landscape, as closely as possible. Significant route segments, historical sites, and artifacts are protected for public use and enjoyment.

2 Within the trail corridors, natural processes (e.g., insects, disease, or fire) function within their natural ecological role.

3 Trail users appreciate, enjoy, and understand the multicultural influence and historical significance of the NHTs and related sites. The NHTs provide users with a diversity of recreational experiences that highlight the natural, cultural, and heritage resources that are unique to the region the trail is passing through.

4 Visitor experience and historic integrity is seamless between forest lands and adjacent ownership.

Standards for National Historic Trails **(DA-NHT-S)**

1 Management of the NHTs must comply with the most recent version of respective comprehensive management plans (CMP). This includes the following:

- a Follow interpretive themes and subthemes identified in approved CMPs;
- b Follow guidelines for intended visitor use types as directed by approved CMPs;
- c Follow guidelines for approved signs and images as directed by approved CMPs;
- d Follow trail maintenance guidelines identified in approved CMPs.

Guidelines for National Historic Trails **(DA-NHT-G)**

1 Management activities in NHT corridors should be consistent with, or make progress toward achieving, scenic integrity objectives of high or very high within the foreground of the trail (up to 0.5 mile either side) or within the identified trail viewshed, the landscape area visible from the trail based on topography.

2 Forest health projects should be used to achieve management objectives within trail corridors only to the extent necessary to accomplish plan objectives (e.g., vegetation) while protecting the nature and purpose of the NHT and minimizing scenic and physical impacts of vegetation treatments on the trail and its corridor.

3 Where concerns for the protection of cultural resources do not allow for development of the trail on the historic route, a route should be selected that provides a vicarious experience within the cultural landscape and as close as possible to the historic route.

Management Approaches for National Historic Trails **(DA-NHT-MA)**

1. Rely on the cooperative management efforts and support of State, local, and private interests, including trail advisory councils, to ensure the protection of trail-related resources, to provide outdoor recreational opportunities, to maintain and build trail facilities, and to accomplish the objectives of interpretive programs with a focus on assisting visitors to understand and appreciate the trails' history and significance.
2. Consider inventory and identification of intact trail segments (including reroutes and alternative alignments) in coordination with the National Park Service and Bureau of Land Management, as appropriate. Consider working collaboratively to ensure that signs installed along the route follow the sign plan indicated in each trail's comprehensive plan.
3. Request a landscape architect or other scenery specialist to analyze all proposed projects for impacts to scenery in all distance zones (foreground, middleground, and background) associated with an NHT corridor.
4. Consider implementing controlled surface use stipulations within the trail corridor on Federal lands and on lands of other ownership where Federal subsurface rights exist.

National Recreation Trails

National Recreation Trails (NRT) are local or regionally significant trails that represent outstanding recreation opportunities for diverse communities. They provide day-use or extended trail experience for a variety of recreation opportunities accessible from urban areas (FSM 2350). There are over 1,000 trails in all 50 states. These trails offer spectacular views and high-quality recreation opportunities.

NRTs are cooperatively managed among a number of agencies, including the Forest Service, for the primary purpose of outdoor recreation. Regional Foresters may establish national recreation trails (FSM 2353.04) as provided in section 4 of the National Trails System Act (16 U.S.C. 1243).

Ecosystem services supported by NRTs are largely cultural in nature. The trails provide exemplary outdoor recreation opportunities, which encourage connection with the landscape and promote physical and mental health.

The Santa Fe NF is home to two NRTs: the Cañones National Recreation Trail and the Winsor National Recreation Trail (figure 5).

Cañones National Recreation Trail

Cañones NRT is 10.9 miles long. It begins at Cerro Pavo Trailhead in the Coyote Ranger District and ends where it meets with trail 102. This trail offers spectacular views of the Cañones Canyon walls. The canyon provides habitat for numerous types of wildlife. The trail is open to hiking, fishing, horseback riding, and other non-motorized recreational uses.

Winsor National Recreation Trail

Winsor NRT is a 9-mile, continuous trail composed of two short segments of the NFS trail system located within the Española District of the Santa Fe NF—part of Winsor trail (trail #254) and Chamisa trail (trail #183). The trail begins at the end of State Road 475 in the lower parking lot in the Santa Fe Ski Basin, also known as Aspen Basin, and proceeds in a southwesterly direction downhill following mountain contours and ridge lines until it drops into the valley of Big Tesuque Creek. From there, the trail follows the creek 2 miles downstream before turning south into a small drainage on trail #183, climbs a ridge, and drops into Chamisa Canyon leading back to State Road 475. The trail passes through three vegetation zones of the New Mexico Uplands and touches a fourth.

Desired Conditions for National Recreation Trails **(DA-NRT-DC)**

1 NRTs provide opportunities for non-motorized recreation in various locations as well as a diversity of experiences with different components of solitude, remoteness, and development.

2 Conflicts among trail users are rare and easily resolved.

Guidelines for National Recreation Trails **(DA-NRT-G)**

1 Management activities within foreground views (up to 0.5 mile) from the trail should meet a scenic integrity objective of at least high.

2 Management activities in the middleground (up to 4 miles) and background (from middleground to horizon) should meet or exceed a scenic integrity objective of at least moderate.

3 Special-use permits that affect NRTs should include the best management practices for scenery management.

4 Management activities should maintain safe public access to NRTs.

5 NRTs should be consistent with management direction in the trail establishment reports as well as the maintenance standards for trail class and use.

Management Approaches for National Recreation Trails **(DA-NRT-MA)**

1. Work with volunteer groups, partners, local governments, and adjacent landowners to:
    - maintain trail corridors,
    - maintain the condition and character of the surrounding landscape, and
    - facilitate support by trail users that promotes 'Leave No Trace' principles and reduces user conflict.

Scenic Byways

The National Scenic Byways Program was established in 1991, to recognize, preserve, and enhance selected roads throughout the Nation. The program aims to promote tourism and economic development in rural communities and provide opportunities to explore the beauty, history, and natural heritage of the national forests.

The National Scenic Byways Program is administered by the U.S. Department of Transportation, Federal Highway Administration. The U.S. Secretary of Transportation recognizes these designated roads based on one or more intrinsic qualities—archaeological, cultural, historic, natural, recreational, or scenic (DOT 1995).

The most important management tool and metric associated with scenic byways is the Scenery Management System, which is used to manage, maintain, and improve the viewshed associated with the designated byway. Secondary is the recreation opportunity spectrum, which further defines the recreation setting, development levels, and opportunities to users within the byway corridor.

Scenic byways provide the important cultural ecosystem service of access to and experience of natural settings. In some cases, people who may not be able to hike trails can still access the Santa Fe NF and its accompanying cultural, historical, and social values and traditions via motorized recreation on scenic byways. Scenic views can also contribute to psychological and emotional health, which are important cultural ecosystem services. When people use the scenic byways to view outstanding scenic views or historical elements, they also spend time and money in small communities; the scenic qualities created by nurturing supporting, regulating, and provisioning ecosystem services thereby support rural economic development. The scenic byways may also contribute to these other ecosystem services by drawing people away from more sensitive areas for their recreation, thereby, providing space for biodiversity and other supporting and regulating ecosystem services to function undisturbed.

Five national scenic byways are within the Santa Fe NF (see figure 5):

- **Route 66 (pre-1937 alignment) National Scenic Byway** is sometimes called “The Mother Road.” The Secretary of Transportation designated it as a national scenic byway in October 2009. Only Arizona, Illinois, New Mexico, and Oklahoma have designated Route 66 as a national scenic byway. The entire route is 2,448 miles long, and runs from Chicago to Los Angeles. However, the length of the designated national scenic byway is 1,409 miles, with a 604-mile-long segment crossing New Mexico (USDA Forest Service 2015). Coming into Santa Fe, the historic route runs parallel to Interstate 25 (I-25). The route travels through the Pecos/Las Vegas Ranger District, traveling close to the Pecos River at various points. Finally, the historic route goes south on Highway 84. This byway also carries a historic state designation. The Historic Route 66 National Scenic Byway Corridor Management Plan (Tidwell and Rosoff 2009) guides the management of this byway.

- **El Camino Real National Scenic Byway** was designated in September 2005. It is 299 miles long and runs from El Paso, Texas, through New Mexico, nearly to the Colorado border. It follows the Rio Grande River and the I-25 corridor. El Camino Real also carries a New Mexico State designation, and is also designated El Camino Real de Tierra Adentro National Historic Trail (2000). Stretching 1,150 miles from Mexico City to Santa Fe, the highway was for three centuries the Southwest’s main conduit for traders, settlers, and social change. The route of the Camino is now paralleled by modern highways—the Pan-American Highway of Mexico, Interstate 10 from El Paso to Las Cruces, and I-25 from Las Cruces to

Santa Fe. Sites along the way include the Pueblo of San Felipe, El Rancho de las Golondrinas, and the city of Santa Fe (New Mexico Highway and Transportation Department 1998).

- **Jemez Mountain Trail** is 163 miles long and passes geological formations, ancient Indian ruins, and an Indian pueblo. The area is rich in logging, mining, and ranching heritage. Roughly 65 miles of this lengthy trail are located in the Santa Fe NF. Beginning north of Albuquerque in the village of San Ysidro at the junction of New Mexico 44 and New Mexico 4, this trail winds through the Jemez Mountains. Along the route are the towns of Jemez Pueblo, Jemez Springs, and Cuba, among others. There are also great stop-offs at Soda Dam (a natural dam formed by thousands of years of minerals from a natural spring), Seven Springs, and the ancient cliff dwellings at Bandelier National Monument.

- **Santa Fe National Forest Scenic Byway.** This nationally recognized strip of highway starts in the historic downtown plaza in Santa Fe, follows New Mexico Highway 475, and ends after 16 miles at the Santa Fe Ski Area. Spring and summer wildflowers dot the uphill road cuts and slopes below the road. The drive is most scenic in autumn when the aspen colors are in full effect. The Santa Fe National Forest Scenic Byway has an Interpretive Master Plan available to help guide managers make this an available and useful resource to visitors (USDA Forest Service no date). There are many great stops on the way. Vista Grande Overlook, near the top of the byway, has spectacular views of the Rio Grande Valley between the Jemez Mountains to the west and the Sangre de Cristo Mountains. The cities of Santa Fe, Los Alamos, White Rock, and on clear days, even Albuquerque are visible from this vista. Big Tesuque and Aspen Vista both have great views of the fall foliage. There are a number of campgrounds and picnic areas along the way.

- **Santa Fe Trail National Scenic Byway.** In 1821, the Santa Fe Trail became America's first great international commercial highway, and for nearly 60 years thereafter was one of the Nation's great routes of adventure and western expansion. Mindful of this, the Santa Fe Trail Association was created in 1986, to help protect and preserve it. The U.S. Congress likewise recognized the significance of the trail to American history by proclaiming it a national historic trail in 1987 (Santa Fe Trail Association).

Desired Conditions for Scenic Byways **(DA-SB-DC)**

1 Viewsheds from scenic byways are consistent with desired conditions for scenery and appear natural, with only minimal evidence of human activities.

2 Scenic byways provide access to and appreciation of the forest while supporting rural community economic development.

Guidelines for Scenic Byways **(DA-SB-G)**

1 Visual impacts from management activities and infrastructure should meet scenery objectives as identified on the Scenic Integrity Objective Map.

2 Management activities within the foreground (up to 0.5 mile on either side) should be consistent with the scenic integrity objective of high.

Management Approaches for Scenic Byways **(DA-SB-MA)**

1. Work with the New Mexico Department of Transportation and county highway departments to manage hazard trees within the immediate foreground of scenic byways (up to 300 feet on either side).
2. Work with the New Mexico Department of Transportation, the Federal Highway Administration, and local communities to improve services and interpretive opportunities on byways.
3. Consider using signs, kiosks, exhibits, and other educational tools (e.g., brochures, auto tours, websites, and social media) to provide interpretive, educational, and safety information along scenic byways, in adjacent recreation sites, and at visitor contact points (e.g., ranger stations).

Management Areas

The Santa Fe NF has several areas requiring different management that cannot be met through forestwide plan components and are not designated areas. These areas are identified as management areas. Management areas are similar to designated areas, but differ in that they are defined as part of the forest plan and not designated by Congress or administratively established. Management areas can include proposed designated areas, such as proposed research natural areas, recommended wilderness, or eligible wild and scenic rivers that are managed as management areas until they are designated. A management area represents a management emphasis for an area or several similar areas across the landscape.

Management areas identified in this plan for the Santa Fe NF are:

- Caja del Rio Wildlife and Cultural Interpretive Management Area
- Cañada Bonita Recommended Research Natural Area
- Cultural Interpretive Management Area
- Oil and Gas Leasing Management Area
- Recommended Wilderness Management Area
- Eligible Wild and Scenic River Management Area

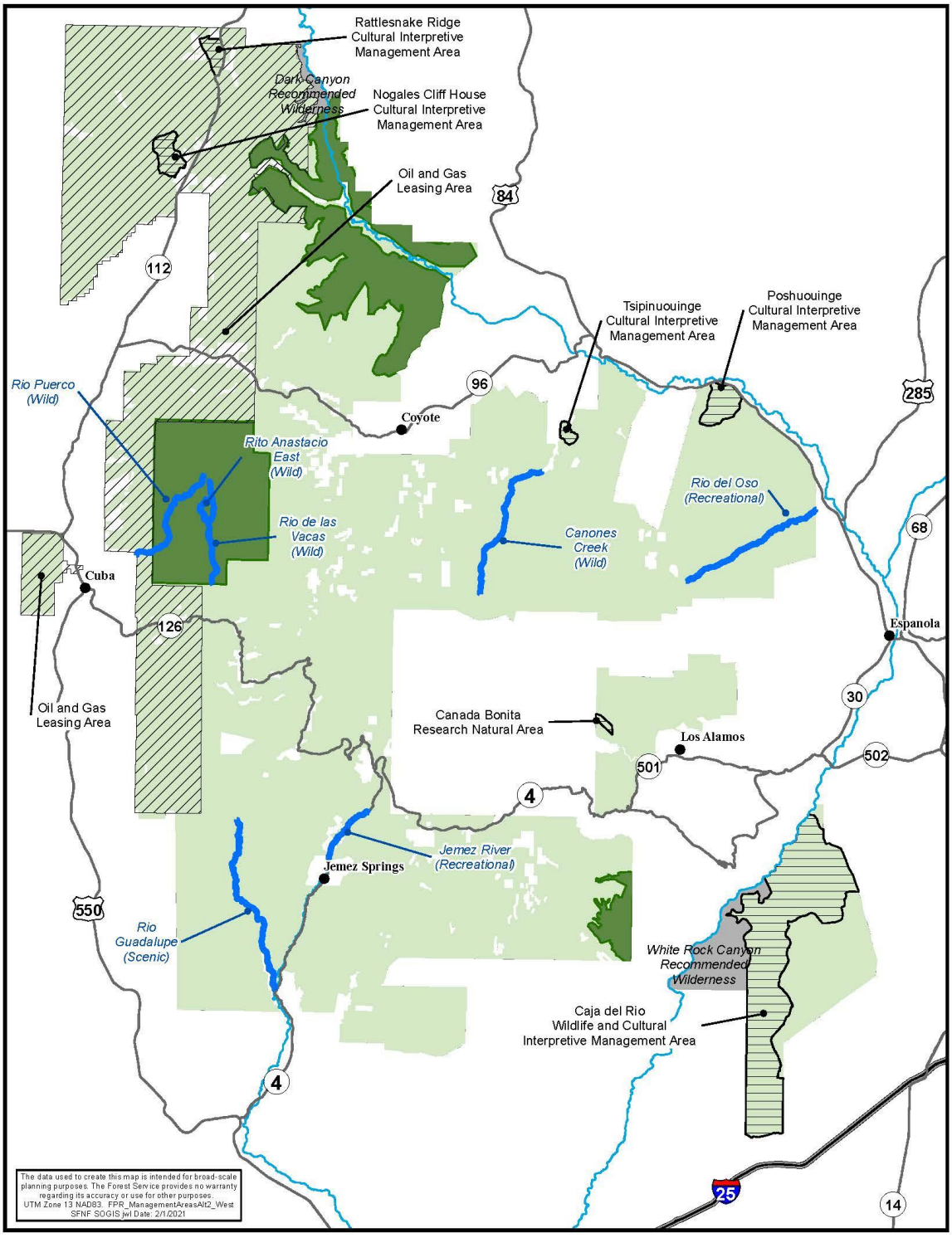


Figure 6-west. Management areas for the western half of the Santa Fe NF, from Cuba to Española. For legend see figure 6-east.

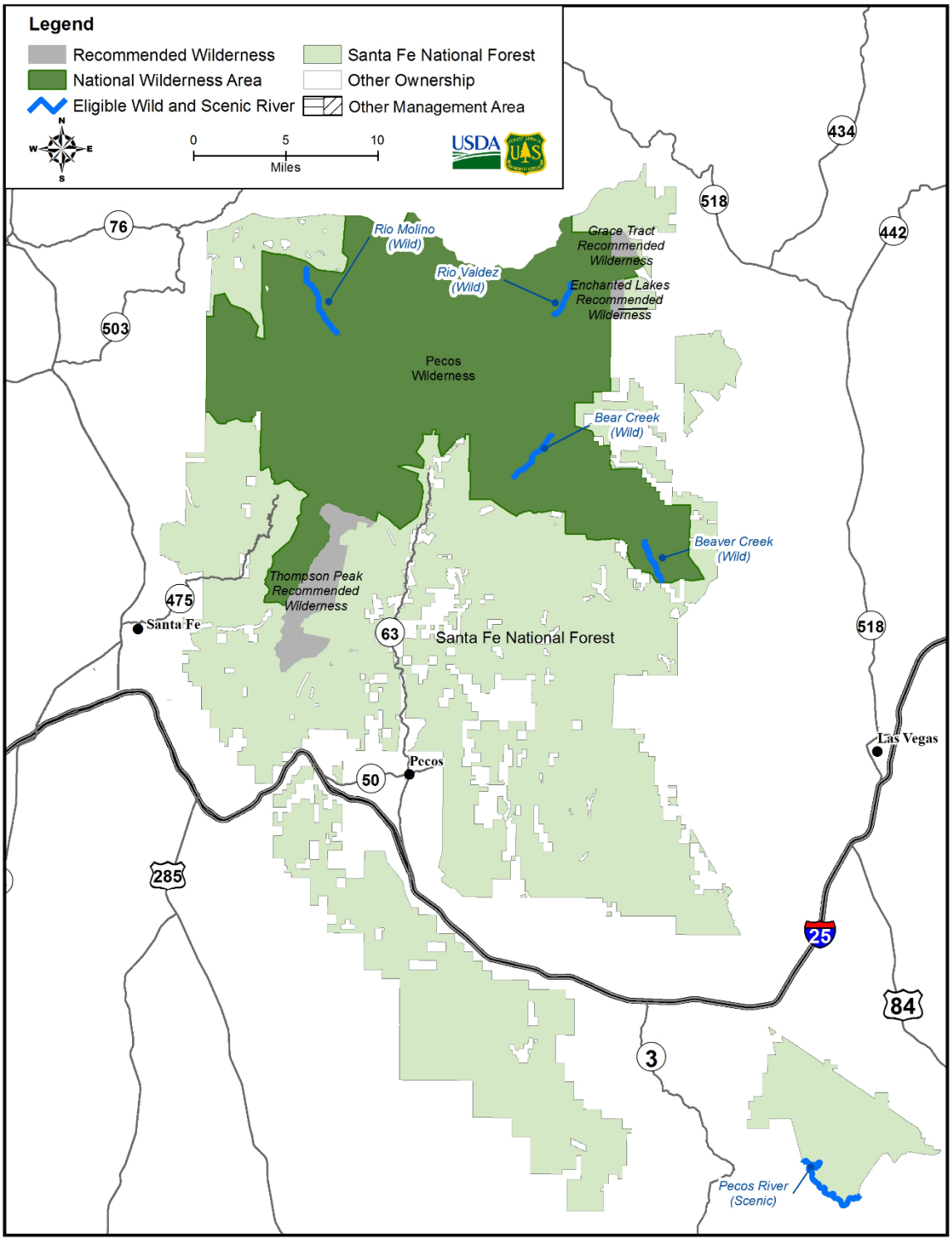


Figure 6-east. Management areas for the eastern half of the Santa Fe NF, from Española to Las Vegas

Caja Del Rio Wildlife and Cultural Interpretive Management Area

The Caja del Rio Wildlife and Cultural Interpretive Management Area runs down the middle of the Caja del Rio plateau, which is about 15 miles west of the city of Santa Fe (see figure 6-west). Moving west from this management area lies Santa Fe NF recommended wilderness along the Rio Grande River, designated wilderness across the river and within Bandelier National Monument (National Park Service), and then the designated Dome Wilderness in the Santa Fe NF. Outside of the management area, the eastern part of the plateau is more heavily used with a network of motorized routes, mountain biking and horseback riding trails, and structures to support livestock grazing. This area is covered by a variety of land jurisdictions, including the Forest Service, Bureau of Land Management, New Mexico State, Santa Fe County, and private land. Along the northeastern boundary of the plateau is the Buckman Direct Diversion facility, which provides water throughout Santa Fe County.

The landscape is generally flat to rolling with more rugged terrain along the western edge above the Rio Grande River. The entire plateau is bound by cliffs or escarpments, many with rivers or Canadas: White Rock Canyon and the Rio Grande River on the northwestern edge; a large escarpment “La Bajada” easily visible from I-25 along the western edge; the Santa Fe River runs through a canyon along the southern edge; and the ephemeral stream, Canada Ancha, along the northeastern edge, but outside of the management area.

The Caja is diverse in plant and animal species, both in overall numbers (population) as well as what species are found in the area (biodiversity). The plateau does not conform to the typical notion of forest land: juniper grass, Colorado Plateau Great Basin, piñon-juniper shrub, piñon-juniper woodland, and piñon-juniper sagebrush ERUs make up the management area. Its grasslands and other ecosystems provide habitat for many sensitive species. The area is also an important bird area; declining grassland bird species can be found on the plateau, as well as other birds such as golden and bald eagles and peregrine falcons. Other habitats, such as intermittent ponds and playas, support aquatic life. The interplay between the locally diverse environments and bird and animal species is unique when compared to other areas of the forest, including the range from steep canyon riparian to open grassland on the south end and rugged volcanic country on the plateau above the river. The remote setting, limited motorized routes, and continuity with recommended and designated wilderness as well as inventoried roadless areas along the corridor of the Rio Grande River provide habitat connectivity for daily and seasonal wildlife movement along and across the river and the potential for long-distance range shifts of species.

The area also contains nationally significant cultural resources including the ancestral homes of modern Pueblo communities, numerous petroglyph localities, and the intact remains of historic roads and trails such as the original alignment of Route 66 and the El Camino Real del Tierra Adentro. The archeological integrity of these features, which consists of their location and physical environment, materials and workmanship, and design help preserve their aesthetic or historic sense that make them valuable.

Once only moderately accessible, construction of the New Mexico-599 (NM-599) bypass has made local access easier and increased the popularity of the area. The area provides abundant and accessible recreational opportunities in a remote setting with limited motorized routes.

The Caja del Rio Wildlife and Cultural Interpretive Management Area provides supporting ecosystem services through the rich biodiversity found there. It also provides abundant cultural ecosystem services through the preservation of sites that are an important part of the historic fabric of this region. Finally, the education opportunities this site offers, specifically regarding wildlife and culture, are another cultural ecosystem service.

Desired Conditions for Caja Del Rio Wildlife and Cultural Interpretive Management Area **(MA-CAJA-DC)**

1 The natural character of the Caja del Rio supports wildlife diversity and connectivity, and maintains the cultural and archeological integrity found there, while providing interpretive opportunities for the public to learn about these resources, in an area easily accessible to metropolitan Santa Fe.

2 The biological and cultural value of the area is recognized both internally and by the public.

3 Education and recreation opportunities exist for national historic trails that have local and national interest, including the Camino Real del Tierra Adentro and Route 66.

Objectives for Caja Del Rio Wildlife and Cultural Interpretive Management Area **(MA-CAJA-O)**

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

2 Portions of the national historic trails in the Caja del Rio to promote a sense of discovery for visitors.

3 Opportunities to view and protect the unique flora and fauna in the area.

Standard for Caja Del Rio Wildlife and Cultural Interpretive Management Area **(MA-CAJA-S)**

1 Maximize use of existing utility line corridors for additional utility line needs. New utility corridors and communication sites will not be allowed.

Guidelines for Caja Del Rio Wildlife and Cultural Interpretive Management Area **(MA-CAJA-G)**

1 Outside of the IRA, the designation of motorized cross-country areas and the construction of permanent or temporary roads should be avoided unless required by a valid permitted activity or for management actions that would help meet desired conditions (e.g., wildlife, ecological health, or managing cultural resources). Roads should be constructed and maintained at the lowest maintenance level needed for their intended purpose. Maintenance and reconstruction should be allowed on existing roads.

2 Range improvements should be designed to improve wildlife habitat and connectivity:
   a Water developments should be considered to discourage livestock use in natural watering holes.
   b New fences and corrals should not be constructed. Maintenance and reconstruction of fences should prioritize wildlife-friendly designs to reduce impacts to migrations.

3 Low-flying altitude maneuvers for permitted military activities should only be allowed during times that avoid breeding seasons for known populations of at-risk species.

4 To promote a sense of discovery and preserve the wild and natural characteristics and features, interpretation about the wildlife and cultural features of the Caja del Rio should not include permanent developed interpretive facilities in the Caja del Rio.

Management Approaches for Caja Del Rio Wildlife and Cultural Interpretive Management Area **(MA-CAJA-MA)**

1. Use cross-agency collaboration (e.g., National Park Service, Bureau of Land Management, Cochiti Pueblo, and Los Alamos National Laboratory) and tribal consultation to facilitate wildlife connectivity and protection of important archaeological, cultural, and sacred sites.
2. Consider closures (e.g., for activities such as target shooting or drone use) to protect wildlife and maintain increased potential for wildlife-viewing opportunities.
3. Consider conducting condition assessments and developing stabilization plans on significant ancestral pueblos.
4. Consider discouraging take-off and landing of drones in or near canyons to avoid effects to at-risk wildlife species.

Cañada Bonita Recommended Research Natural Area

The Cañada Bonita grassland is nestled in the Jemez Mountains on the western portion of the Santa Fe NF several miles west of the community of Los Alamos. The Thurber fescue grassland is perched on a southwest-facing slope of up to a 40 percent grade covering an elevation band between 9,200 to 9,800 feet (Mohlenbrock 1988). Thurber fescue grasslands are montane grasslands, nestled in mixed-conifer forests, and were once found on most high-elevation south-facing ridges and peaks throughout the Jemez Mountains and the Southwest. These grasslands are some of the most productive native grasslands in New Mexico and have diverse plant and animal communities. At this site, the adjoining forest includes remnant patches of old-growth mixed-conifer and spruce-fir forests, including some of the oldest aspen ever documented. Although restricted in where it can occur, this grassland type was once regionally widespread. Based on the well-developed Mollisol (prairie-type) soils, these grasslands are known to be thousands of years old. However, in the past century conifer tree invasion, livestock grazing, and fire suppression have limited their extent and occurrence from their historic distribution. This particular site has retained its characteristics because it has been protected from livestock grazing since 1943, as part of a protected buffer zone associated with work occurring at Los Alamos National Laboratory.

The Cañada Bonita recommended research natural area (RNA) management area offers an example of an outstanding high-elevation Thurber fescue (*Festuca thurberi*) grassland community at or very near its climax expression. This management area provides the best, and possibly the only, opportunity for maintenance of a Thurber fescue meadow within the Southwestern Region. Thus, the Cañada Bonita Management Area is a recommended RNA because of its high-quality Thurber fescue grassland. Similar to designated RNAs, this management area would be an excellent area for studying this type of ecosystem and for monitoring long-term ecological change. The area also has an extensive history of research on the grasslands, soils, adjoining forest vegetation, including tree-ring studies on fire history, forest age patterns, and tree invasion of the grassland; and wildlife, including the endangered Jemez Mountain salamander. This research provides a solid baseline for future studies on these ecosystems.

Cañada Bonita was managed as a proposed RNA in the 1987 Forest Plan. An environmental analysis for the area was conducted as part of the environmental impact statement for the 1987 Forest Plan and supported designation of the area as an RNA, although the area was never officially designated. Today, this area still meets the requirements of an RNA and is, therefore, being re-recommended in this forest plan. RNAs are administratively designated by the Regional Forester and the Research Station Director.

The Cañada Bonita recommended RNA provides supporting ecosystem services through the maintenance and preservation of the rare Thurber fescue grassland. In addition, the research and educational opportunities associated with this community type are cultural ecosystem services.

Desired Conditions for Cañada Bonita Recommended Research Natural Area **(MA-CANBON-DC)**

1 The Cañada Bonita MA is natural-appearing and ecological processes (e.g., plant succession, fire, and insect and disease) function with limited human influences.

2 The Cañada Bonita MA is an area for the study of ecosystems and ecological processes, including succession, and serves as a baseline area for measuring ecological change from disturbances or stressors like climate change.

Standards for Cañada Bonita Recommended Research Natural Area **(MA-CANBON-S)**

1 No surface occupancy for minerals, geothermal, or oil and gas extraction shall be allowed.

2 Vegetation manipulation or removal of forest products for commercial purposes and personal use (including firewood) shall not be permitted or authorized, unless it is necessary to maintain the ecological process or the natural characteristics that make the Cañada Bonita MA suitable for designation as an RNA.

3 New trail construction shall not be permitted.

4 Special-use permits must not be permitted, except for research that would not lead to long-term effects on the characteristics specific to the Cañada Bonita MA.

5 Only non-motorized, day-use recreational activities are allowed in the Cañada Bonita MA.

6 New roads must not be constructed, and closed roads shall not be opened.

7 Campfires are not allowed.

8 New utility corridors must not be permitted or authorized.

Guideline for Cañada Bonita Recommended Research Natural Area **(MA-CANBON-G)**

1 Management activities should be consistent with the corresponding scenic integrity objective (as defined by the Scenic Integrity Objective Map).

Management Approaches for Cañada Bonita Recommended Research Natural Area **(MA-CANBON-MA)**

1. Collaborate with appropriate agencies and universities regarding scientific opportunities.
2. Encourage partnerships and volunteers to provide onsite interpretation and monitoring.
3. Consider marking the boundary of the Cañada Bonita RNA and using kiosks to educate the public about the area's purpose, and permitted and prohibited activities.

Cultural Interpretive Management Area

Humans have occupied and used the land in and around the Santa Fe NF for over 10,000 years. In these early years, indigenous populations were the only people to occupy and use this land, which is concurrent with the earliest human occupation of the Western Hemisphere. Cultural resource sites reflect a record of these early inhabitants and are important in the identity of local communities, the state of New Mexico, the region, and the Nation. About 10,000 cultural resources have been recorded in just under 35 percent of the forest.

Tourists are attracted to cultural resources because of their nature and significance, as well as the character of traditional communities. Interpreted cultural resource sites provide opportunities for the public, especially youth, to learn about the lifeways of the people who have lived on this land. Contemporary uses of cultural resource sites are critical for maintaining the identity of both historic and modern communities. Cultural tourism also contributes to the economy of local communities.

The sites within this management area have long attracted the interest of archaeologists and recreationists. Information about each site and its location is readily available online and in print, and the sites receive frequent visitation from private recreationists and guided tours. Each site has varying levels of excavation, preservation, and interpretive development. Some sites have been stabilized to protect them while continuing to support visitation and access. The areas surrounding each core site and interpretive trail provides additional opportunities for visitors to experience less-developed sites and acquire an additional sense of discovery and wonder about what life was like in the past.

The Cultural Interpretive Management Area provides cultural ecosystem services such as education and recreation opportunities, as well as spiritual connections to the past.

This management area contains four archaeological sites and their associated interpretive development located across three districts of the Santa Fe NF (see figure 6-west).

Nogales Cliff House

Nogales Cliff House consists of a cliff dwelling complex of mud and stone structures constructed on the west side of the wall of Spring Canyon in the Cuba Ranger District. The site is the largest known grouping of cliff dwellings in the Gallina Region. The Gallina culture is defined as a pre-contact period group of Ancestral Pueblo people defined by archaeologists as living between the San Juan Basin and the Rio Chama, and south of the San Juan River, but north of the Jemez Mountains. The cliff house is located in a scenic and steep-sided canyon, but is surrounded by the remains of an extensive 12th and 13th century occupation. Nogales Cliff House may have formed the central location for the more extensive community toward the end of its occupation. This type of site is rare in the area, but the architecture is characteristic of the region, although sites more typically occurred in the open.

Nogales Cliff House was excavated in the late 1930s. In the 1990s, interest in the site increased and a recreation trail was constructed from the bottom of Spring Canyon to provide access.

Poshuouinge

Poshuouinge is a large Ancestral Tewa pueblo and consists of the architectural remains of a double-plaza multi-room pueblo. It is located on a bench above the Rio Chama in the Española Ranger District, near the village of Abiquiú. One of a number of large Classic Period pueblos occupying the

basin of the Rio Chama, Poshuouinge was inhabited by the ancestors of modern-day Tewa pueblo communities that live throughout the Española Valley. The pueblo had multiple stories that were constructed primarily from adobe turtlebacks (convex-shaped blocks formed from baskets of mud) that were laid up in courses, with the occasional cobble for reinforcement. Built around A.D. 1420, Poshuouinge was abandoned before A.D. 1500, and prior to the entry of Europeans to the Northern Hemisphere. The pueblo had line of site visibility to a number of other large Classic Period pueblos occupied around the same time. Other early historic materials from Spanish, Ute, and Apache visitors can also be found on the site because of its proximity to the historic town of Abiquiú.

The site was excavated in the early 20th century using crew members from modern Tewa communities. Its scenic beauty and location near the highway and Abiquiú make Poshuouinge popular for locals and recreational visitors. In the early 1990s, an interpretive trail was constructed leading from a hardened parking lot at the foot of the bench to where the site lies. A short trail leads to two separate overlooks above the site and limits disturbance to the site. The management area boundary includes a large area that likely encompasses the majority of the Poshuouinge community located on public land. The site serves the same purpose as a local city park for many locals and the trail receives intensive use by locals for exercise.

Rattlesnake Ridge

Rattlesnake Ridge consists of a large, widely distributed set of archaeological resources including pit houses, surface houses, surface features, and other site elements. The site is located on a large ridge in the north end of the Cuba Ranger District. Rattlesnake Ridge is associated with the archaeologically defined Gallina culture and was occupied from the 12th to the middle of the 13th centuries.

The archaeological remains on the mesa consist of a number of clusters of architectural features, as is typical of Gallina open sites. The site was excavated in the 1950s and 1980s. In the 1990s, a recreation trail was constructed from a new road and parking area. This trail was designed to provide an accessible rural experience for physically challenged individuals and is well-suited for interpretive signs.

Tsipinuouinge

Tsipinuouinge is a large Ancestral Tewa pueblo and consists of the architectural remains of a single multi-room pueblo. It is located on a prominent mesa in the Coyote Ranger District and is the northernmost pueblo of a sequence of large Classic Period pueblos occupying the basin of the Rio Chama. Tsipinuouinge was inhabited by the ancestors of the modern-day Tewa pueblo communities that live throughout the Española Valley. Built around A.D. 1275, and abandoned before A.D. 1450, the pueblo is constructed from loaf-shaped blocks of volcanic tuff and stands multiple stories high with cavate rooms on the eastern side. This construction must have presented a formative image to people entering the basin of the Rio Chama. The pueblo also stood as a gatehouse to the stone tool raw material sources of Cerro Pedernal and Cerro Polvadera.

Tsipinuouinge has never been formally excavated but is popular because of its scenic beauty and superlative archaeology. In the 1990s, a new switchback trail was built from the top of Polvadera Mesa down to the south edge of the site. Access to the site is by permit only. While the focus of community life in Tsipin would have included the canyons surrounding Cañones, some of this occurs on private land. The management area boundary includes the access trail as well as the

canyon and mesa top, demarking the area on public land that is most likely to have comprised the immediate community for the occupants of Tsipin.

Desired Conditions for Cultural Interpretive Management Area **(MA-CULTINT-DC)**

1 The structures and trails are stable and in good condition and provide accessible, quality viewing experiences for the sites without further impacts to the architectural remains.

   a Tsipinuouinge trail follows local conditions and steep terrain, and is a challenging experience for physically capable visitors.

   b Rattlesnake Ridge trail is in sufficient condition to provide a rural accessible experience for all, including physically challenged visitors.

   c The adobe walls and other structural fabric of the Nogales Cliff House and its associated structures is structurally sound and in good condition.

   d The trail to Poshuouinge is in sufficient condition to provide a rural, but moderately accessible experience for visitors as well as a quality visitor experience to view the site.

2 Interpretation and educational materials provide a sense of what life was like in these communities in the 12th through 15th centuries.

3 Opportunities exist for research, exploration, and documentation of these historic sites.

Objectives for Cultural Interpretive Management Area **(MA-CULTINT-O)**

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

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

Guidelines for Cultural Interpretive Management Area **(MA-CULTINT-G)**

1 Architectural elements should be stabilized using National Park Service Historic Preservation standards.

2 New trails, trail reroutes, and viewing areas should be constructed to avoid impacts to the archeological integrity of a site, while still allowing for visitor appreciation.

   a Tsipinuouinge trail should be maintained in the original alignment which, although steep, provides an opportunity to view the site without damaging its archeological integrity.

   b When the sites' architectural elements are damaged, they should be closed to visitors until the damage has been remediated and mitigation measures against future damage have been implemented.

Management Approaches for Cultural Interpretive Management Area **(MA-CULTINT-MA)**

1. Coordinate with federally recognized tribes and pueblos, and local communities to discuss local access and needs on the sites, construction of trails, and development of interpretive materials.
2. Consider providing a Forest Service representative (e.g., staff, law enforcement, volunteers, tribal members) at the sites during high-use holiday weekends to ensure site protection as well as provide interpretive information.
3. Consider an intensive cultural resource survey of the entire management area to document the full extent of the site itself and better understand its context in the surrounding landscape.
4. Consider developing a management plan for the interpretation and stabilization of each site, including:
    - A baseline condition and stabilization needs assessment of the sites, and
    - Periodic follow-up assessments every 2 years to evaluate the impacts to the sites.

Oil and Gas Leasing Management Area

The San Juan Basin is a geologic region of northwestern New Mexico and southwestern Colorado that is known for its reserves of oil and natural gas. The western edge of the Santa Fe NF contains a small portion of the easternmost part of the San Juan Basin (figure 6-west), although this area is outside the most productive oil and gas formations within the basin.

Even though the BLM issues the leases for oil and gas, the Forest Service must verify that the lands have been analyzed in a forest plan-level leasing analysis prior to authorizing that the BLM can issue any leases. This analysis was conducted as part of the 2008 and 2012 oil and gas leasing environmental impact statements, which amended the 1987 plan and are being carried forward into this plan. Prior to individual developments on the ground, the Forest Service must conduct a second level of NEPA analysis based on the site-specific location, as well as the specific plans of operations.

The Oil and Gas Leasing Management Area provides stipulations to protect resources from actions associated with oil and gas leasing in the portion of the forest where there is the potential for these activities. These stipulations are used to provide agency recommendations to the BLM for issuing new leases on NFS lands. Stipulations include “no surface occupancy,” “controlled surface use,” and “timing limitations” to protect wildlife and surface resources. Conditions of approval and mitigation measures are developed and applied during the second-level NEPA site-specific analysis conducted for individual leases.

The Oil and Gas Leasing Management Area provides protections for abundant supporting ecosystem services such as water, wildlife, and soil; regulating ecosystem services associated with riparian zones; and cultural ecosystem services associated with cultural resources. In addition, the management area provides protection of deer and elk winter ranges, and fawning periods help keep game populations steady, thus providing provisioning ecosystem services such as food. The availability of oil and gas leasing and development in the forest provides for the provisioning ecosystem services of energy and fuel.

Desired Conditions for Oil and Gas Leasing Area **(MA-OGLEASE-DC)**

1 Oil and gas activities meet the legal mandates to facilitate the development of minerals in a manner that minimizes adverse impacts to surface and groundwater resources, watershed and forest ecosystem health, wildlife and wildlife habitat, scenic character, and other desired conditions applicable to the area.

2 Reclamation of oil and gas extraction areas restores resource damage and removes public safety hazards.

Standards for Oil and Gas Leasing Area **(MA-OGLEASE-S)**

1 The following timing limitations apply to drilling operations and construction activities. These do not apply to daily operation and maintenance of producing wells.

- a Prohibited during the Mexican spotted owl's critical nesting and breeding period (between March 1 and August 31) to ensure reproductive and post-fledgling success within Mexican spotted owl protected activity centers. An exception, modification, or waiver to the timing limitation may be granted if surveys according to protocol are conducted and the area is not used for nesting. A public notice and comment period is required prior to waiver, exception, or modification waiver of this stipulation.
- b Prohibited during the northern goshawk's critical nesting and breeding period (between March 1 and September 30) to ensure reproductive and post-fledgling success within northern goshawk nesting post-fledging area. An exception, modification, or waiver to the timing limitation may be granted if northern goshawk surveys show that the area is not used for nesting.
- c Prohibited during the peregrine falcon's critical nesting and breeding period (between March 1 and August 15) to ensure reproductive and post-fledgling success within designated peregrine falcon eyries. An exception, modification or waiver to the timing limitation may be granted if surveys show that the area is not used for nesting.
- d Prohibited in the deer and elk winter range along the northwestern edge of the oil-gas study area (between December 15 and March 15). An exception, modification, or waiver to the timing limitation may be granted if the operator demonstrates that the drilling and construction location would not disrupt deer and elk winter habitat.
- e Prohibited during the critical deer fawning and elk calving period (between June 1 and July 31) to minimize risks to herd reproduction within important deer fawning and elk calving area within an area in the southern portion of the oil-gas study area that has been identified as important to the success of deer fawning and elk calving. An exception, modification, or waiver to the timing limitation may be granted if the operator demonstrates that the drilling and construction location would not disrupt deer fawning and elk calving.
- f To protect and limit disturbances from drilling activities to at-risk species and other critical wildlife habitat areas, timing restrictions outlined in current and future Federal recovery plans or forest-defined protected activity centers must be followed.

Guidelines Oil and Gas Leasing Area **(MA-OGLEASE-G)**

1 No surface occupancy should be allowed in the following areas:

   a Generally narrow areas consisting of slopes of 40 percent or greater that have high erosion and mass wasting potential. An exception, modification, or waiver may be granted if onsite inspection shows that unstable or steep slopes do not exist on the specific site, or if the operator can demonstrate in a surface use plan of operations that adverse effects can be minimized and activities safely conducted without loss of long-term site productivity. A public notice and comment period is required prior to waiver, exception, or modification waiver of this stipulation[24].

   b Inventoried roadless areas. An exception, modification, or waiver may be granted if the forest plan designation changes so that the area is no longer classified as semi-primitive non-motorized (ROS), or if the operator can demonstrate in a surface use plan of operations that the activity can be conducted with minimal impacts on the semi-primitive non-motorized characteristics within a site-specific locale. A public notice and comment period is required prior to waiver, exception, or modification waiver of this stipulation.

   c Management areas encompassing and surrounding Nogales Cliff House (110 acres) and Rattlesnake Ridge (90 acres). An exception, modification, or waiver may be granted if a site-specific surface use plan of operations demonstrates that adverse impacts to the cultural resources can be completely avoided, and clearance is obtained from the forest archeologist and State Historic Preservation Officer. A public notice and comment period is required prior to waiver, exception, or modification waiver of this stipulation.

   d Within a 1-mile protection zone for New Mexico Office of the State Engineer recognized drinking water sources. An exception or modification may be granted if the operator's surface and subsurface hydrology studies and mitigation plans were to show that there is no reasonable risk to the quality or quantity at a water source. Roads and power lines may cross a water source protection zone if the operator can demonstrate that it would have less environmental impact than other routes and that adverse effects could be minimized.

2 To avoid adverse impacts to riparian and wetland resources, access roads and pipelines should not be located in riparian TEUs (or equivalent survey system) or where vegetation data indicates riparian or wetland conditions, unless there are no practical alternative locations and they are located and designed to minimize adverse impacts to riparian or wetland resources.

3 Within high scenic integrity objectives, surface-disturbance activities should be located and designed to protect visual quality or to reclaim disturbed areas to meet the visual quality within 3 years from project startup.

4 Well pads, roads, or other surface disturbance activities that would impact highly valued cultural resources should be avoided or minimized. An exception, modification, or waiver may be granted if a site-specific surface use plan of operations demonstrates that adverse impacts to the cultural resources can be completely avoided and clearance is obtained from the forest archeologist and State Historic Preservation Officer. A public notice and comment period is required prior to waiver, exception, or modification waiver of this stipulation.

[24] As per agency NEPA direction.

Management Approaches for Oil and Gas Leasing Area **(MA-OGLEASE-MA)**

1. Consider working with the New Mexico Department of Game and Fish to identify where and when timing limitations are implemented pertaining to deer and elk winter range and deer and elk fawning and calving habitat.

Recommended Wilderness Management Area

Lands that the Forest Service has determined, through land management planning, to have the potential to be included in the Wilderness Preservation System comprise the Recommended Wilderness Management Area. Congress reserves the authority to make final decisions on wilderness designation. The intent of this management area is to provide management direction that preserves the existing wilderness characteristics in these areas, so they are present if Congress acts to designate them. Management of recommended wilderness areas does not alter or restrict existing rights. A detailed process document explaining the wilderness recommendation is located in the FEIS Volume 3, Appendix J: Documentation of Wilderness Recommendation Process.

Ecosystem services provided by recommended wilderness management areas include supporting ecosystem services such as nutrient and water cycling; biodiversity; and regulating ecosystem service such as water filtration, air quality protection, and climate change adaptation. Provisioning ecosystem services of food from hunting and foraging also occur here. Recommended wilderness management areas also provide abundant cultural ecosystem services in the form of recreation, opportunities to connect with nature, providing baselines on unhindered ecosystem processes for ecological research, and the preservation of cultural traditions and historical features.

This management area consists of five areas across four districts of the Santa Fe NF (figure 6-west and figure 6-east).

Dark Canyon Recommended Wilderness Management Area is 2,218 acres and located in the Coyote Ranger District. It lies north of the Chama River Canyon Wilderness and south of the Rio Chama Wilderness Study Area on Bureau of Land Management land just across the Forest Service boundary. The topography of this area is steep and rugged with three canyons that incise the polygon. Vegetation is dense and the dominant vegetation type is mixed conifer and Gambel oak with pockets of ponderosa pine and piñon-juniper in the southern portion of the area. The polygon has many common forest species as well as rare species such as Rio Grande chub and Rio Grande sucker. No developments exist in the area. This terrain contributes to a level of challenge and self-reliance within the area and a sense of solitude.

White Rock Canyon Recommended Wilderness Management Area is 10,280 acres and located in the Española Ranger District. It lies on the western portion of the Caja del Rio plateau and along the Rio Grande River. Across the river is the Bandelier Wilderness in Bandelier National Monument. The terrain includes White Rock Canyon and several arroyos. Vegetation is dominated by piñon-juniper, sagebrush, open grassland, and ponderosa pine patches along the western edge. Wildlife is diverse, in part because the area covers both grasslands and the riparian area around the Rio Grande. The area is an important bird area and includes species such as pinyon jay, gray vireo, southwestern willow flycatcher, western burrowing owl, and golden eagle. Evidence of man is predominated by historic petroglyphs and archeological sites. The western portion of the Caja del Rio is difficult to access and terrain across the area is varied, from rolling grasslands to more rugged cliffs and escarpments along the boundaries. Although close to the metropolitan centers of Santa Fe and Los Alamos, a sense of solitude can be easily achieved in this rarely visited and expansive area.

Thompson Peak Recommended Wilderness Management Area is 9,483 acres and located in the Pecos/Las Vegas Ranger District. Its western boundary follows the Pecos Wilderness and Santa Fe watershed and extends south to Thompson Peak. The vegetation is dominated by ponderosa pine and mixed conifer with some aspen. The topography is rugged and includes many drainages with perennial and seasonal streams. This terrain and the lack of amenities provides a high level of

challenge or risk for visitors. The area offers many high-quality primitive recreation opportunities such as hiking, hunting, and backpacking.

Enchanted Lake and Grace Tract Recommended Wilderness Management Areas are 925 acres and 945 acres, respectively. Both are located in the Pecos/Las Vegas Ranger District, in the northeastern corner of the Santa Fe NF and adjacent to the Pecos Wilderness. Vegetation consists of spruce-fir and aspen, with some ponderosa pine along the lower elevations of the east slopes. Enchanted Lakes has more scrub oak and vegetated rocky areas. The topography for both areas is rugged and steep and the Grace Tract area includes a waterfall. No improvements are found within these areas and both have abundant opportunities for primitive recreation and solitude.

Desired Conditions for Recommended Wilderness Areas (**MA-RECWILD-DC**)

1. Recommended wilderness management areas maintain the wilderness characteristics they were evaluated to possess until their designation as wilderness or other use is determined by Congress.
    a Recommended wilderness management areas represent environments that are essentially unmodified and natural landscapes. Constructed features exist only when they reflect the historic and cultural landscape, when they are the minimum necessary for administration of the area as a recommended wilderness management area, or for the protection of resources.
    b Natural processes (e.g., insects and disease, blowdown, or fires) function within their natural ecological role or are mimicked (e.g., prescribed fire). Human-caused fires other than prescribed fire, which are an unnatural occurrence, are suppressed.
    c Recommended wilderness management areas provide recreation opportunities where social encounters are infrequent and occur only with individuals or small groups, so there are opportunities for solitude. Visitors experience self-reliance, challenge, and risk while enjoying freedom to pursue non-motorized or non-mechanized activities with only the regulation necessary to protect wilderness characteristics.
2 Livestock grazing and acequia management contribute to the long-term socioeconomic diversity and stability of local communities and cultural identity tied to a recommended wilderness management area.
3 Recommended wilderness management areas provide ecosystem services such as contributing to clean air and water, enhancing wildlife habitat, primitive recreation and solitude, and other wilderness characteristics.

Standards for Recommended Wilderness Areas **(MA-RECWILD-S)**

1 Natural processes shall be maintained within recommended wilderness management areas.

- a Fires shall function in their natural ecological role.
- b Insect and disease infestations shall be allowed to run their natural course except where they unacceptably threaten wilderness characteristics.
- c Nonnative invasive species shall be treated using methods and in a manner consistent with wilderness characteristics, or in order to allow natural processes to occur in a recommended wilderness management area.

2 The following projects or activities shall not be authorized in recommended wilderness management areas.

- a Constructing or designating new permanent or temporary roads, motorized trails, or mechanized (e.g., mountain bike) trails for public.
- b Commercial timber harvest.
- c Infrastructure related to special use permits for energy developments (e.g., wind, solar, electrical lines).
- d Sales or extraction of common variety minerals.
- e Motor vehicles, motorized equipment (e.g., chainsaws or wheelbarrows), and mechanical transport, with the following exceptions:
  - i. unless specifically authorized for emergency use,
  - ii. for management activities that move the area toward desired conditions while protecting existing wilderness characteristics over the long-term, or
  - iii. for the limited needs required for authorized management of a grazing allotment or acequia access, which will not result in long-term degradation to wilderness characteristics.
- f Mechanized recreation.

Guidelines for Recommended Wilderness Areas **(MA-RECWILD-G)**

1 Activities in recommended wilderness management areas should maintain or improve the wilderness characteristics until such time as Congress acts on the recommended area, either making it designated wilderness or releasing it for other management.

2 Intervention in natural processes through management activities should only occur where this would move the area toward desired conditions, preserve wilderness characteristics, protect public health and safety within and adjacent to the recommended wilderness management area, or uphold other Federal laws and regulations.

   a Unplanned and planned ignitions should be allowed to reduce the risks and consequences of uncharacteristic wildfire to increase apparent naturalness, or to enhance ecosystem function.

3 Recommended wilderness areas should be managed to preserve or enhance a very high scenic integrity objective.

4 Recommended wilderness areas should be managed for primitive desired ROS classes.

5 Existing structures necessary for administration of the area should be maintained, but not expanded, to protect the area's wilderness characteristics. Maintenance of existing structures should be carried out in a manner that does not expand the evidence of motor vehicle and mechanized equipment use beyond current conditions within the recommended wilderness area.

6 Competitive events should not be permitted in recommended wilderness areas.

Eligible Wild and Scenic River Management Area

Eligible wild and scenic rivers meet the basic criteria for inclusion in the National Wild and Scenic Rivers System. They are free-flowing and possess at least one outstandingly remarkable value (ORV). Preliminary classifications of eligible rivers as wild, scenic, or recreational follow the same characteristics as designated wild and scenic rivers, and are based on the condition and development level in and around the river at the time it was deemed eligible. A detailed document explaining the eligible wild and scenic rivers evaluation process is located in the FEIS Volume 3, Appendix J: Documentation of Eligible Wild and Scenic Rivers Evaluation Process.

In 2017, all rivers in the Santa Fe NF were evaluated to determine their eligibility. This evaluation resulted in 12 river segments totaling approximately 74 miles that have been identified as eligible to be included in the National Wild and Scenic Rivers System (table 4, figure 6-west, and figure 6-east).

Table 4. Eligible river segments in the Santa Fe NF including their location by ranger district, ORV(s), and length of the river segment

River Name	District	ORVs	Classification	Miles
Canoñes Creek	Coyote	Recreation, Scenery, Prehistory, Botanical, Fish	Wild	9.98
Rio Guadalupe	Jemez	Scenery, Prehistory, Recreation	Scenic	13.23
Rio del Oso	Espanola	History, Prehistory	Recreational	10.22
Rito Anastacio East	Cuba	Scenery, Botanical, Fish	Wild	2.07
Rio Puerco	Cuba	Scenery, Botanical, Fish	Wild	8.33
Jemez River	Jemez	Prehistory	Wild	4.34
Pecos River	Pecos-Las Vegas	History	Scenic	6.75
Rio de las Vacas	Cuba	Scenery, Botanical, Fish	Wild	7.20
Rio Molino	Espanola	Fish	Wild	4.45
Rio Valdez	Pecos-Las Vegas	Fish	Wild	2.25
Beaver Creek	Pecos-Las Vegas	Fish, Scenery	Wild	3.05
Bear Creek	Pecos-Las Vegas	Fish	Wild	3.40

Eligible wild and scenic rivers must be managed to maintain the free flow and ORVs they possess at the time of eligibility unless a determination of ineligibility or non-suitability is made. If an eligible river is determined through a suitability study to be not suitable, it shall no longer be considered eligible and plan direction in this management area will no longer apply. If an eligible river is determined to be suitable and is designated by Congress as a wild and scenic river, the designation would not affect existing water rights or the existing jurisdiction of states and the Federal Government, as determined by established laws.

The free-flowing character of eligible wild and scenic rivers is a regulating ecosystem service providing water to downstream sources. Free-flowing water can also be a supporting ecosystem service in the form of water cycling and a provisioning ecosystem service in terms of fresh water. The specific ORVs of each wild and scenic river can have different ecosystem services: Scenic, recreational, historic, and cultural ORVs are cultural ecosystem services, while the fish ORV contributes to supporting ecosystem services.

Desired Conditions for Eligible Wild and Scenic Rivers **(MA-ELIGWSR-DC)**

1 Eligible wild and scenic rivers retain their free-flowing condition and specific ORVs. Recommended preliminary classifications (wild, scenic, or recreational) remain in place until further study is conducted or until designation by Congress.

2 Water-based recreation opportunities are enjoyed by the public, yet recreational activities (such as camping or use of access points) are not altering the free flow and ORVs.

Standards for Eligible Wild and Scenic Rivers **(MA-ELIGWSR-S)**

1 Eligible wild and scenic rivers must be managed to protect or enhance the ORVs for which they were determined to be eligible and to maintain their classification until they are designated or released from consideration. Eligible rivers found unsuitable for inclusion shall be released from further consideration and restrictions of this section.

2 Any authorized water resources project in an eligible river segment must not adversely modify the river's free-flowing character.[25]

3 A suitability study must be completed for all eligible wild and scenic river segments prior to initiating activities that may compromise the ORVs, potential classification, or free-flowing character.

4 Activities in eligible wild and scenic river corridors must comply with interim protective measures outlined in Forest Service Handbook 1909.12, 84.3, or most current version.

Guidelines for Eligible Wild and Scenic Rivers **(MA-ELIGWSR-G)**

1 New roads or motorized trails should not be constructed within 0.25 mile of a wild eligible river segment.

2 Management activities should be consistent with the scenic integrity objectives of:
- a Very high in eligible wild rivers,
- b High in eligible scenic rivers, and
- c Moderate to high in eligible recreational rivers.

3 Management activities should be consistent with the desired ROS classes of:
- a Primitive to semi-primitive non-motorized in eligible wild rivers,
- b Semi-primitive non-motorized to semi-primitive motorized in eligible scenic rivers, and
- c Semi-primitive to roaded natural in eligible recreational rivers.

[25] Water resources projects include all modifications to the stream channel or banks below the ordinary high water mark of a river or stream. Proposed water resources projects must be analyzed to determine their effects on free flow, specifically whether they alter or restrict the natural function of the river (i.e., bank erosion, channel shifting, bed-load or debris movement). Water resources projects that modify free-flowing character may occur only when they mimic natural river processes, restore more natural river function, and are otherwise consistent with the river's eligibility.

Management Approach for Eligible Wild and Scenic Rivers **(MA-ELIGWSR-MA)**

1. Opportunities for enhancing ORVs may be considered in all project management activities within an eligible wild and scenic river corridor.

This page intentionally left blank

Chapter 4. Geographic Areas

Places matter. Across the 1.6 million acres of the Santa Fe NF, there are diverse communities and cultures, recreation uses, and restoration needs. Compared to other national forests, the Santa Fe NF is surrounded by diverse landscapes as well as unusually diverse communities and cultures with roots going back hundreds and thousands of years. Nationwide, not all forest plans use geographic areas (GAs), but to recognize and best manage the similarities and differences that exist across distinct landscapes on the Santa Fe NF, seven GAs have been identified. Each of the seven GAs has different restoration needs, sustainable recreation opportunities, connections to nearby communities, and partnerships with the public. In the following pages, we describe each GA in the context of local communities, uses, and restoration needs, and delineate differences in the social, cultural, and ecological landscapes across the Santa Fe NF.

From west to east, the seven GAs are:

- Canadas and Nacimiento
- Jemez Mesas and Canyons
- North Jemez Mountains
- West Sangres and Caja
- Pecos River Canyon
- East Sangres
- Rowe Mesa and Anton Chico

GAs are made up of the unique cultural identities, ecology, and types of use specific to different places in the forest. These features may align with ranger districts, county lines, watersheds, or other geographic and socioeconomic boundaries. Where people travel from as they access different parts of the forest was also considered in defining boundaries. Therefore, GAs can also represent many small “community” forests within the larger Santa Fe NF. Local community culture, economic drivers, natural and human-made landscape features, ecology, types of recreation, and restoration needs shaped the GAs, which are delineated by easily recognized natural features and infrastructure (e.g., waterways, roads, and ridges).

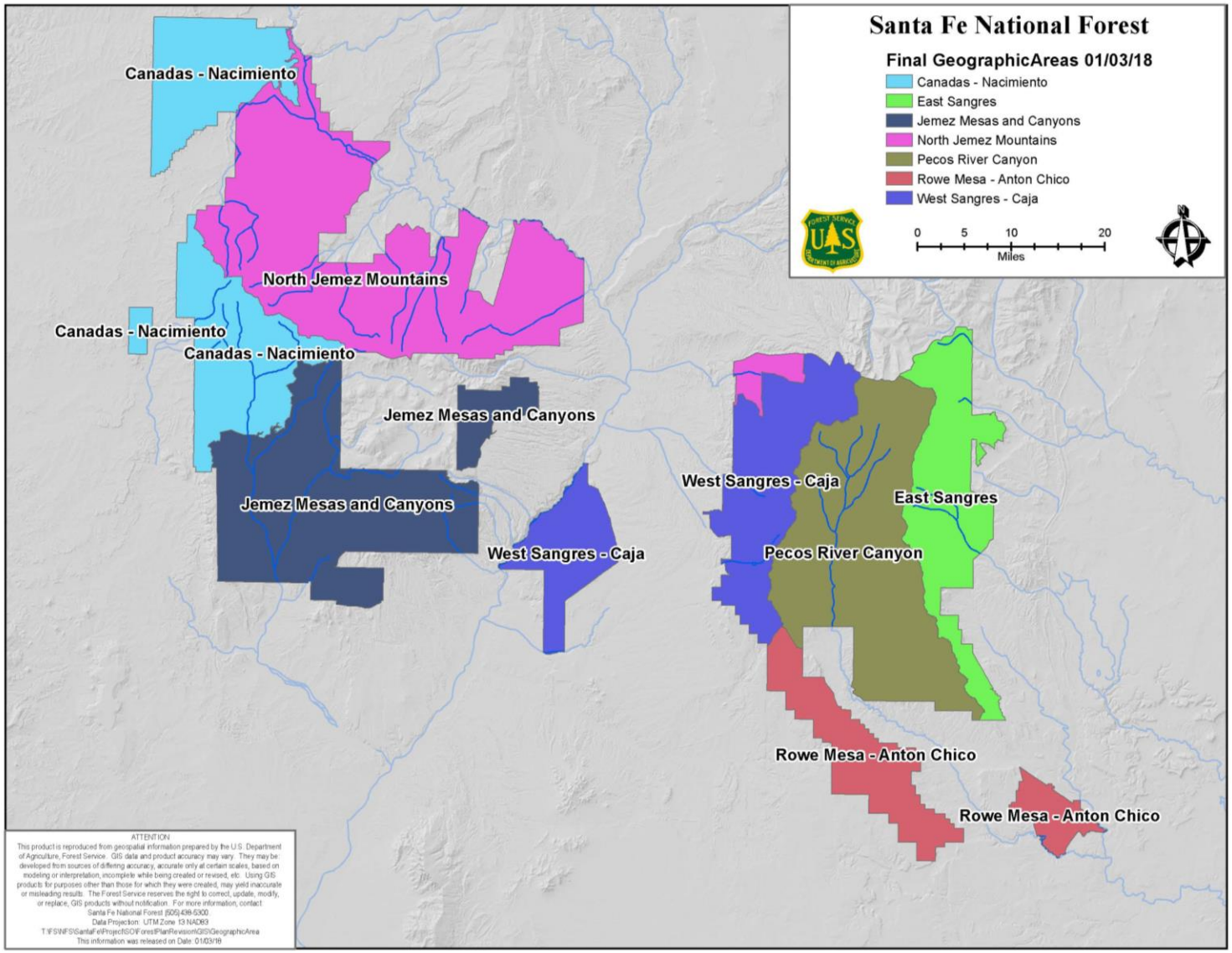


Figure 7. Santa Fe NF geographic areas

Canadas and Nacimiento

Description

The Canadas and Nacimiento Geographic Area, composed of two non-contiguous portions of NFS land totaling over 242,523 acres, lies along the western edge of the Santa Fe NF. The landscape varies greatly from mesas, canyons, and knife ridges in the Canadas, to heavily forested mountains, meadow valleys, and flowing waterways throughout the Nacimiento.

Canadas borders BLM land to the west, the Jicarilla Apache Nation Reservation to the north, and Chama River Canyon Wilderness to the east. Deadman's Lookout, a historic fire tower visible throughout the north end of this GA, serves as a primary landmark for locals and visitors alike.

Nacimiento borders the towns of Cuba, Regina, and La Jara on the west and the Nacimiento Range and Valles Caldera National Preserve to the east. Nacimiento encompasses the San Pedro Parks Wilderness, which is over 40,000 acres, and includes meadows and rivers as well as the Continental Divide National Scenic Trail. The GA also has grazing operations, including numerous small, family-owned grazing operations that provide income to local families.

Parts of designated areas within the Canadas and Nacimiento GA include:

- 2 Designated Wilderness Areas
    - Chama River Canyon (less than 1 acre, less than 1 percent of this wilderness within the Santa Fe NF is in this GA)
    - San Pedro Parks Wilderness (24,335 acres, 59 percent is in this GA)
- 1 Wild and Scenic River
    - Rio Chama Wild River (13 acres, less than 1 percent is in this GA)
- 1 National Recreation Area
    - Jemez National Recreation Area (124 acres, less than 1 percent is in this GA)
- 4 Inventoried Roadless Areas
    - Chama Wilderness (286 acres, 22 percent is in this GA)
    - Chama Wild and Scenic River (85 acres, 2 percent is in this GA)
    - Pollywog (8,556 acres, 100 percent is in this GA)
    - San Pedro Parks (5,793 acres, over 99 percent is in this GA)
- 1 Wild Horse and Burro Territory
    - Mesa De Las Viegas Wild Horse Territory (7,054 acres, 49 percent is in this GA)
- 1 National Hiking Trail
    - Continental Divide National Scenic Trail (10 miles, 26 percent of the trail within the Santa Fe NF is in this GA)

- 1 Scenic Byway
    - Jemez Mountain Scenic Byway (17 miles, 27 percent of this scenic byway within the Santa Fe NF is in this GA)

Management areas within the Canadas and Nacimiento GA include:

- Oil and Gas Leasing Area
- Nogales Cliffhouse Cultural Interpretive Area
- Rattlesnake Ridge Cultural Interpretive Area
- Eligible Wild and Scenic Rivers include:
    - Rito Anastacio East: Wild (2.1 miles of the Rio Guadalupe watershed)
    - Rio Puerco: Wild (8.3 miles of the Arroyo San Jose-Rio Puerco watershed)
    - Rio de las Vacas: Wild (7.2 miles of the Rio Guadalupe watershed)

Local Communities and Human Use

Rugged mesas and wide canyons in the Canadas provide a barrier to casual recreational access, though small- and large-scale grazing operations as well as hunting are commonplace. Commercial oil and gas development thrives on the western portion of the GA, and it provides employment for regional residents who reside in surrounding communities or live as far away as Farmington. A limited number of meadows and streams attract large game, most notably providing elk winter range. Mule deer and bear, as well as elk, are common and attract hunters in the fall.

Nacimiento is easily accessible, which allows for the ongoing access integral to local traditional uses by land grants, and federally recognized tribes and pueblos. Nacimiento includes headwaters for clean flowing water that feeds park-like meadows, such as Church Meadow, which is a common recreation site for picnicking and car camping. Streams in this GA supply downstream acequias with high-quality dependable water that sustains regional agriculture and cultural traditions. Wood gathering by land grant communities, and federally recognized tribes and pueblos for heating homes and cooking, in addition to firewood gathering by visitors from surrounding cities, is typical. These traditional uses occur alongside recreational uses like outfitting, fishing, dispersed camping, and horseback riding.

Restoration Needs

Ponderosa pine and piñon-juniper forest restoration and meadow protection is needed throughout this GA. The thinning of dense, small-diameter trees and shrubs in combination with prescribed burning, will support long-range restoration efforts and reinstate natural fire regimes. Restoration will result in decreased woody encroachment of meadows, restored and preserved grasslands, improved watershed health, and greater wildlife diversity. In addition, traditional cultural uses and recreation in the GA, ranging from wood gathering, hunting, and acequia irrigation to camping, hiking, and picnicking, will benefit from improved forest health and waterway function.

Desired Conditions (GA-CANNAC-DC)

1 Headwaters are bountiful with high water quality and support ecological resources and multiple uses, including acequias.

2 Recreation is well distributed across the GA and includes diverse experiences such as designated and dispersed camping for individuals and larger groups (e.g., Church Meadows), hunting, cultural interpretive areas, wilderness experiences in San Pedro Parks, and the Continental Divide National Scenic Trail.

3 Oil and gas development as well as other commercial uses contribute to the local economies of surrounding communities.

Jemez Mesas and Canyons

Description

The 286,938-acre Jemez Mesas and Canyons Geographic Area skirts the Valles Caldera National Preserve to the east and south as well as Jemez and Zia Pueblos to the west. Bandelier National Monument and the community of Los Alamos lie along the southeastern boundary, and the GA also encompasses the 5,000-acre Dome Wilderness. A tributary to the Rio Grande, the Jemez River, transects the GA, flowing year-round from its headwaters at the Valles Caldera National Preserve. The presence of water in this GA, exemplified by the Rio Cebolla, provides diverse habitats like wetlands, meadows, and forests essential to threatened and endangered species like the New Mexico meadow jumping mouse, Jemez Mountain salamander, and the Mexican spotted owl.

Thermal activity in this GA contributes to multiple hot springs, which attract visitors interested in soaking and viewing unique geologic features at Soda Dam, San Antonio, Spence, and McCauley Hot Springs. In addition to the river and hot springs, Fenton Lake, a human-made reservoir on the northern edge of this GA, is a landmark and popular recreation site for water sports.

Recreation is the main use throughout the GA, and the Jemez National Recreation Area (over 57,000 acres) is designated specifically for recreation ranging from rock climbing to hunting. The Jemez Mesas and Canyons GA draws New Mexicans from across the state, as well as tourists from out of state, who are able to access the GA year-round via the well-travelled Jemez Mountain Trail National Scenic Byway. The GA also has grazing operations, including numerous small, family-owned grazing operations that provide income to local families.

Designated areas within the Jemez Mesas and Canyons GA include:

- Dome Wilderness (5,181 acres, 100 percent is in this GA)
- 9 Inventoried Roadless Areas
    - Alamo Canyon (8,628 acres, 100 percent is in this GA)
    - Bearhead Peak (8,274 acres, 100 percent is in this GA)
    - Canada Bonita RNA (487 acres, 100 percent is in this GA)
    - Cerro La Jara (1,122 acres, 100 percent is in this GA)
    - Ghost Town (219 acres, 100 percent is in this GA)

- Guaje Canyon (6,101 acres, 100 percent is in this GA)
- Peralta Ridge (4,025 acres, 100 percent is in this GA)
- Rendija (2,175 acres, 100 percent is in this GA)
- Virgin Canyon (6,067 acres, 100 percent is in this GA)

- 1 Scenic Byway
  - Jemez Mountain Scenic Byway (46 miles, 73 percent of this scenic byway within the Santa Fe NF is in this GA)
- 2 Wild Horse and Burro Territories
  - Dome Wild Burro Territory (3,426 acres, 100 percent is in this GA)
  - San Diego Wild Horse Territory (2,274 acres, 100 percent is in this GA)
- 1 National Recreation Area
  - Jemez National Recreation Area (57,594 acres, over 99 percent is in this GA)
- 3 Wild and Scenic Rivers
  - East Fork Jemez Recreation River (586 acres, 100 percent is in this GA)
  - East Fork Jemez Scenic River (1,378 acres, 100 percent is in this GA)
  - East Fork Jemez Wild River (1,103 acres, 100 percent is in this GA)
- 2 Research Natural Areas
  - Canada Bonita, Proposed Research Natural Area (434 acres, 100 percent is in this GA)
  - Monument Canyon, Research Natural Area (583 acres, 100 percent is in this GA)

Management areas within the Jemez Mesas and Canyons GA include:

- Oil and Gas Leasing Area
- Canada Bonita Proposed Research Natural Area
- Eligible Wild and Scenic Rivers include:
  - Rio Guadalupe: Scenic (13.2 miles of the Rio Guadalupe watershed)
  - Jemez River: Wild (4.3 miles of the Upper Jemez River watershed)

Local Communities and Human Use

The Jemez Mesas and Canyons Geographic Area has been used for thousands of years by the Towa and Tewa people. With over 7,000 known archaeological sites, the GA has the highest density of archaeological sites in the country. Surrounding tribes, pueblos, and land grant communities continue to live in the region and use this part of the forest daily for sustenance and traditional uses like hunting, harvesting fuelwood, grazing, and collecting forest products for cultural ceremonies.

Recreation is the most popular modern use of the Jemez Mesas and Canyons GA. While locals enjoy walking in the forestlands around their homes, visitors are attracted to dispersed recreation, ATV use, RV camping, hiking, fishing, and accessing hunting (e.g., elk and turkey) through the Jemez

Mountain Scenic Byway. Accessibility to picturesque vistas not only attracts tourists and recreationists, but also draws the commercial film industry, which regularly uses the GA as a backdrop.

The staggering volume of archaeological resources, and proximity to Los Alamos and Sandia National Laboratories, locality of the Rocky Mountain United States Geological Survey Station, and the Valles Caldera National Preserve have established this GA as a cornerstone of archaeological research and land management initiatives in the western United States and attracted researchers from across the country. For example, implementation of the Southwest Jemez Collaborative Landscape Restoration Project introduced an influx of researchers eager to study fire and fuels management as well as landscape-scale forest restoration.

Restoration Needs

The history of uncharacteristic wildfire and ongoing high-use recreation have demanded forest restoration efforts and recreation management. The Southwest Jemez Collaborative Landscape Restoration Project is aimed at forest and riparian restoration throughout this GA, and riparian restoration is needed along major tributaries of the Jemez River to ensure greater water quality in the future. In response to fuel thinning needs in the forest, the Pueblo of Jemez established the Walatowa Timber Industries in 2012. Walatowa Timber Industries has partnered with the Santa Fe NF, Valles Caldera National Preserve, and private landowners to thin wood and brush; harvest timber; and sell lumber, latillas and firewood, connecting indigenous livelihoods to landscape-scale forest management efforts.

High-use recreation across the Canadas and Nacimiento GA, predominantly overnight camping along waterways and along NFS Road 376, has negatively impacted vegetation and water quality. Compacted soils from vehicles parked alongside roads, illegal dumping, and noise and air pollution require management of dispersed camping to promote a healthy watershed. Hot springs and geologic features that attract high volumes of recreational visitors, like Soda Dam, pose public safety hazards and are vulnerable to both degraded water quality and damage to geologic formations.

Restoration in this GA will serve both modern and traditional user communities that depend on the forest for traditional and cultural uses as well as livelihoods. Furthermore, restoration will restore and preserve grasslands, as well as ensure sustainable high-quality recreation opportunities, while protecting the invaluable natural resources found in this GA.

Desired Conditions (GA-JEMMC-DC)

1 Restored ponderosa pine, mixed conifer forests, and riparian systems are regionally significant examples of these healthy vegetation types within the Southwest.

2 Recreation opportunities abound, including wilderness experiences, especially in association with the Jemez National Recreation Area. Vulnerable features (e.g., waterways, hot springs, and geologic features such as Soda Dam) are protected for the enjoyment of future generations even in areas of heavy use (e.g., NFS Road 376).

3 Water quality and availability are keystone features that ensure excellent watershed function for the Jemez River, its tributaries, the downstream Rio Grande, and acequias.

North Jemez Mountains

Description

The 404,168-acre North Jemez Mountains Geographic Area rises from the San Juan Basin on the west to mesas, knife ridges, and remote meadows that drop into the Chama River Canyon Wilderness on the east, and borders the Valles Caldera National Preserve and San Pedro Parks Wilderness on the south. Borrego Mesa on the northwest corner of the eastern side of the Santa Fe NF is included in the North Jemez Mountains GA because the terrain is similar, and local communities predominantly use these parts of the forest in the same way. The rugged nature of the GA and roadless wilderness along the Chama River Canyon Wilderness allows wildlife to thrive.

The geology of the northwestern portion of this GA, which borders the Nacimiento GA, has potential for oil and gas development and the greatest number of grazing permittees in the forest. The GA has grazing operations, and while some are large-scale, there are also numerous small, family-owned grazing operations that provide income to local families.

Designated areas within the North Jemez Mountains GA include:

- 2 Designated Wilderness Areas
    - San Pedro Parks Wilderness (16,965 acres, 41 percent is in this GA)
    - Chama River Canyon Wilderness (43,072 acres, 100 percent of this Wilderness within the Santa Fe NF is in this GA)
- 17 Inventoried Roadless Areas
    - Arroyo de la Presa (6,171 acres, 100 percent is in this GA)
    - Arroyo de los Frijoles (5,275 acres, 100 percent is in this GA)
    - Cañones Creek (3,937 acres, 100 percent is in this GA)
    - Chama Wilderness (1,006 acres, 78 percent is in this GA)
    - Chama Wild and Scenic River (4,080 acres, 98 percent is in this GA)
    - Clara Peak (787 acres, 100 percent is in this GA)
    - El Invierno (29,911 acres, 100 percent is in this GA)
    - El Lagunito (6,796 acres, 100 percent is in this GA)
    - Lemitas (8,122 acres, 100 percent is in this GA)
    - Mesa Alta (1,868 acres, 100 percent is in this GA)
    - Oso Vallecitos (1,116 acres, 100 percent is in this GA)
    - Polvadera (2,486 acres, 100 percent is in this GA)
    - Polvadera Peak (6,289 acres, 100 percent is in this GA)
    - Pueblo Mesa (3,538 acres, 100 percent is in this GA)
    - Rio Medio (2,841 acres, over 99 percent is in this GA)
    - San Pedro Parks (26 acres, less than 1 percent is in this GA)

- Youngsville (6,117 acres, 100 percent is in this GA)

- 1 Scenic Byway
  - Old Spanish Trail (25 miles, 100 percent of this scenic byway within the Santa Fe NF is in this GA)
- 2 National Hiking Trails
  - Cañones Creek National Recreation Trail (11 miles, 100 percent of this trail within the Santa Fe NF is in this GA)
  - Continental Divide National Scenic Trail (30 miles, 74 percent of the trail within the Santa Fe NF is in this GA)
- 2 Wild Horse and Burro Territories
  - Chicoma Wild Horse Territory (2,893 acres, 100 percent is in this GA)
  - Mesa De Las Viegas Wild Horse Territory (7,368 acres, 51 percent of is in this GA)
- 4 Wild and Scenic Rivers
  - Rio Chama Management Segment (522 acres, 100 percent is in this GA)
  - Rio Chama Scenic River (1,443 acres, 100 percent is in this GA)
  - Rio Chama Study River (1,175 acres, 100 percent is in this GA)
  - Rio Chama Wild River (2,695 acres, over 99 percent is in this GA)

Management areas within the North Jemez Mountains GA include:

- Oil and Gas Leasing Area
- Tsipinuouinge Cultural Management Area
- Poshuinge Cultural Interpretive Area
- Eligible Wild and Scenic Rivers include:
  - Cañones Creek: Wild (10.0 miles of the Abiquiu Reservoir watershed)
  - Rio del Oso: Recreational (10.2 miles of the Rio Ojo Caliente-Rio Chama watershed)

Local Communities and Human Use

The iconic mesa peak Cerro Pedernal, made famous by the paintings of Georgia O'Keeffe, is the dominant landmark in the GA, and has long been a sacred site in Tewa ancestral lands and the Jicarilla Apache origin story. Tea Kettle Rock, a unique geologic feature, provides a local landmark and also represents the border between this GA and the Valles Caldera National Preserve.

Traditional cultural uses by surrounding communities for hunting, grazing cattle, piñon harvesting, and fuelwood gathering is the leading human use of the North Jemez Mountains GA. Small local communities that dot the landscape between forestland boundaries, and occupy inholdings throughout this GA, have depended on forest access and products for centuries and continue to rely on the GA to sustain local livelihoods and culture. Further, indigenous communities including Tewa, Jicarilla Apache, and Navajo peoples access the GA to visit sacred sites, gather forest products for ceremonies, and hunt game. Numerous cultural sites that have sacred meaning to these groups exist in this GA, and protection of those sites and access for families is crucial for local

cultural tradition. Visitors come to the GA and its surrounding lands to visit Ghost Ranch Event Center and explore Georgia O'Keefe's historic home, camp along the Chama River and high alpine meadows (e.g., the popular Resumidero Campsite), and pass through on the way to Abiquiu Reservoir, El Vado Lake, and Heron Lake State Parks.

Restoration Needs

Thinning of dense, small-diameter vegetation and prescribed burning will support long-range restoration efforts and reinstate natural fire regimes. Restoration will result in decreased woody encroachment of meadows, restored and preserved grasslands, improved watershed health, and greater wildlife diversity. In addition, traditional cultural uses and recreation in the GA, ranging from wood gathering, hunting, and acequia irrigation to camping, hiking, and picnicking, will benefit from improved forest and waterway function.

Desired Conditions (GA-NJEMM-DC)

1 Prescribed and natural fires protect, maintain, and enhance resources and move toward vegetative desired conditions on a landscape scale throughout the North Jemez Mountains Geographic Area, especially around reservoirs.

2 Forest users have frequent opportunities to connect with the unique cultural, historical, and ecological resources in the North Jemez Mountain Geographic Area including the Rio Chama corridor, the Chama River Canyon Wilderness, the Continental Divide National Scenic Trail, and NFS Road 96. Existing trails, like the Cañones Creek National Recreation Trail, improve access and expand use. Outside of developed areas, recreation opportunities are rugged backcountry experiences where solitude can be found.

3 Rural communities have access to the forest for subsistence and traditional uses such as fuelwood, piñon picking, hunting, recreating with families and youth, and small family grazing operations.

West Sangres and Caja

Description

The West Sangres and Caja Geographic Area starts south of Borrego Mesa and stretches over 203,903 acres along the western slope of the Sangre de Cristo Mountain Range to Grasshopper Canyon south of Shaggy Peak. Small streams throughout the West Sangres and Caja GA support dense forests that rise from piñon-juniper woodlands to spruce-fir alpine peaks. A municipal watershed for the city of Santa Fe is close to recreational trails, comprising 17,000 acres of the uppermost reaches of the Santa Fe River. The Santa Fe Ski Basin attracts locals and visitors throughout year.

The West Sangres and Caja GA includes the Caja del Rio Plateau, a mesa non-contiguous with the rest of the GA, which lies west of the city of Santa Fe, north of Cochiti Pueblo, and is only separated from Bandelier National Monument and Bandelier Wilderness by the Rio Grande River. While the indigenous communities and residents of the city of Santa Fe consider the Caja del Rio part of their local landscape, this part of the West Sangres and Caja GA is unique in terrain and use. The Caja del Rio is an arid mesa, and the recreation experiences there are less developed and more exploratory

than other parts of the West Sangres and Caja GA. Tetilla Peak, Whiterock, and Diablo Canyon are the iconic landmarks of this GA. The GA also has grazing operations, including numerous small, family-owned grazing operations that provide income to local families.

Designated areas within the West Sangres and Caja GA include:

- Pecos Wilderness (76,624 acres, 39 percent of this wilderness within the Santa Fe NF is in this GA)
- 12 Inventoried Roadless Areas
    - Arroyo Montoso (6,267 acres, 100 percent is in this GA)
    - Black Canyon (1,920 acres, 100 percent is in this GA)
    - Caja (5,297 acres, 100 percent is in this GA)
    - Juan de Gabaldon Grant (8,016 acres, 100 percent is in this GA)
    - Little Tesuque (814 acres, 100 percent is in this GA)
    - McClure Reservoir (375 acres, 100 percent is in this GA)
    - Nichols Reservoir (1,517 acres, 100 percent is in this GA)
    - Pacheco Canyon (1,007 acres, 100 percent is in this GA)
    - Rancho Viejo (3,825 acres, 100 percent is in this GA)
    - Rio Medio (less than 1 acre, less than 1 percent is in this GA)
    - Tesuque Creek (810 acres, 100 percent is in this GA)
    - Thompson Peak (18,984 acres, 58 percent is in this GA)
- 3 Scenic Byways
    - Santa Fe National Forest Scenic Byway (15 miles, 100 percent of this scenic byway within the Santa Fe NF is in this GA)
    - Route 66 Pre-1937 Alignment (1 acre, 24 percent of this scenic byway within the Santa Fe NF is in this GA)
    - El Camino Real (6 acres, 100 percent of this scenic byway within the Santa Fe NF is in this GA)
- 1 National Hiking Trail
    - Winsor National Recreational Trail (14 miles, 57 percent of this trail within the Santa Fe NF is in this GA)
- 1 Wild Horse and Burro Territory
    - Caja Wild Horse Territory (8,809 acres, 100 percent is in this GA)

Management areas within the West Sangres and Caja GA include:

- Caja del Rio Cultural/Interpretive/Biological Management Area
- Eligible Wild and Scenic Rivers include:
    - Rio Molino: Wild (4.5 miles of the Santa Cruz River watershed)

Local Communities and Human Use

Much of the GA is adjacent to indigenous pueblos, residential communities, and urban areas, resulting in heavy human use including small-scale grazing operations, hunting, fuelwood gathering, and recreation. Parts of this GA are adjacent to the city of Santa Fe and are used heavily for recreation by locals and tourists who frequent a broad network of trails primarily for day uses such as hiking, mountain biking, and horseback riding. The Winsor National Recreation Trail as well as Tesuque and Atalaya peaks provide leading recreation opportunities, with uses ranging from mountain biking to hiking and skiing. The Santa Fe Ski Basin provides recreational opportunities including skiing, snowboarding, hiking, chairlift rides, and disc golf. Aspen viewing in the fall is a favorite activity along Hyde Park Road; the golden aspens can also be easily spotted from the city of Santa Fe and by those on I-25 as they summit La Bajada!

Restoration Needs

The West Sangres and Caja GA is a popular recreation destination for locals and tourists, which has resulted in increased pressure on developed campsites and trails. Recreation requires new strategies to improve high-use and developed recreation while decreasing user conflicts. In addition, overly dense forests in this GA increase the risk of uncharacteristic, stand-replacing wildfire in the extensive wildland-urban interface along the border of the city of Santa Fe and the Santa Fe Municipal watershed, requiring forest restoration such as thinning and prescribed burning of dense, small-diameter vegetation. The Caja del Rio Plateau, within the West Sangres and Caja GA, requires restored and preserved woodlands and grasslands. Forest restoration and improved recreation management will improve public safety, access, ecological health and function, and sustain long-term continued enjoyment and dependence by locals and tourists.

Desired Conditions (GA-WSANCAJA-DC)

1 Most fire burns with low and moderate intensity and there is a very low risk of uncharacteristic wildfire in the wildland-urban interface of Santa Fe and the city of Santa Fe's water sources (e.g., Santa Fe watershed and Buckman Diversion).

2 In the mountains above Santa Fe, diverse non-motorized recreation opportunities (e.g., hiking, horseback riding, mountain biking, skiing, and wilderness experiences) are popular and users find well-marked and maintained trails, frequent encounters with other recreationists without conflict, and facilities (e.g., parking and bathrooms) appropriate for the recreation level and in balance with ecological resources and other multiple uses.

3 Recreation opportunities on the Caja del Rio are rugged and exploratory. Motorized and mechanized recreation occur on the east side of the Caja del Rio.

4 Collaborative partnerships with local communities and visitors across jurisdictional boundaries support the local economy promote sustainable recreation and restored ecosystems.

Pecos River Canyon

Description

The Pecos River Canyon Geographic Area begins at the dramatic alpine peaks and lakes that feed the Pecos River headwaters, supporting mixed conifer forests, abundant wildlife, and human communities downriver. This 178,484-acre GA includes part of the second largest wilderness in New Mexico, the 220,000-acre Pecos Wilderness, and spans predominantly rugged ridgetops, where high-quality water is abundant, and the rare Holy Ghost ipomopsis thrives (Holy Ghost Canyon is home to the only naturally occurring population of this endangered plant). As elevation declines southward, windswept tundra and lush meadows drop into steep granite canyons with flowing water and dense forests. Increased accessibility in the southern portion of the Pecos River Canyon GA allows plentiful and diverse human use opportunities. The Santa Barbara Divide, an alpine ridge that delineates the northern edge of the Pecos Basin and Pecos Wilderness, is a notable landmark and recreation destination, providing breathtaking views of many high peaks.

South of the Pecos Wilderness, the narrow Pecos River Canyon cuts through steep and rocky hillsides on either side. The Pecos River—the heart of life and activity in the GA—is paralleled by an arterial road that leads locals and visitors up tributary drainages throughout the canyon. The Pecos River is an integral part of life for local communities and provides the foundation for the local economy, especially recreation-based businesses that rely on recreation activities in the canyon.

Recent wildfires have changed vegetation composition and scarred the landscape in the canyon, while also impacting local communities economically and socially. The Viveash (2000), Dalton (2002), Tres Lagunas (2013), and Jaroso (2013) fires closed the canyon intermittently over the course of 15 years, each time impacting the social fabric and economic viability of local communities. Historically, as well as currently, areas such as Dalton, Alamitos, and Davis Willow provided forest products such as firewood, vigas, and timber for lumber. These areas were also harvested to support the mining operations at Terrero. The GA also has grazing operations, including numerous small, family-owned grazing operations that provide income to local families.

Designated areas within the Pecos River Canyon GA include:

- Pecos Wilderness (84,983 acres, 43 percent is in this GA)
- 7 Inventoried Roadless Areas
    - Grass Mountain (3,251 acres, 100 percent is in this GA)
    - Holy Ghost (2,351 acres, 100 percent is in this GA)
    - Jacks Creek (740 acres, 100 percent is in this GA)
    - Pecos Wild and Scenic River (5,392 acres, 100 percent is in this GA)
    - Thompson Peak (13,993 acres, 42 percent is in this GA)
    - Wesner Spring (15 acres, 3 percent is in this GA)
    - Willow Creek (1,476 acres, 100 percent is in this GA)
- 2 Scenic Byways
    - Route 66 Pre-1937 Alignment (2 miles, 36 percent of this scenic byway within the Santa Fe NF is in this GA)

- Old Santa Fe Trail (3 miles, 34 percent of this scenic byway within the Santa Fe NF is in this GA)

- 1 National Hiking Trail
  - Winsor National Recreational Trail (11 miles, 43 percent of this NHT within the Santa Fe NF is in this GA)
- 1 Wild and Scenic River (One designation with two categories, recreation and wild)
  - Pecos Recreational River (2,432 acres, 100 percent is in this GA)
  - Pecos Wild River (4,385 acres, 100 percent is in this GA)

Management areas within the Pecos River Canyon GA include:

- Eligible Wild and Scenic Rivers include:
  - Rio Valdez: Wild (2.3 miles of the Cow Creek-Pecos River watershed)
  - Bear Creek: Wild (2.4 miles of the Cow Creek-Pecos River watershed)

Local Communities and Human Use

If the Pecos River is the heart of the canyon, the surrounding communities are the pulse. With deep connection to the Pecos River, along with surrounding mountains and streams, locals regularly camp, fish, and hunt in the GA. Beyond the GA, locals still depend on the Pecos River headwaters to irrigate agricultural operations that stretch from the GA all the way to Texas. Though this GA is near the city of Santa Fe, the culture is distinct with roots, traditions, and uses of the land going back hundreds and thousands of years. Adding to the cultural context of the Pecos River corridor, prehistoric use during the Paleo-Indian, Archaic, Basketmaker, and Puebloan periods likely involved hunting, fishing, gathering herbs and other plants, and some farming. As early as 1600, Spanish explorers began scouting the upper Pecos River Valley for mineral wealth. With the coming of more permanent European and Hispanic settlers in the late 18th and early 19th centuries, the GA saw increased use for grazing, logging, hunting, trapping, and mining.

Large game animals including deer, elk, and bighorn sheep flourish amongst the peaks and provide excellent hunting opportunities, often guided by local outfitters. Numerous trailheads at the wilderness boundary provide access to backpacking, hunting, and horseback riding, as well as access to fishing along the Wild and Scenic Pecos River and accompanying streams. The historic Beatty's Cabin, Beatty's Flats, and high mountain lakes (e.g., Lake Katherine, Stuart, Pecos Baldy and Truchas Lakes) are popular destinations. Lower reaches of the Pecos River Canyon are used heavily for both high-use recreation and traditional uses. Small cattle operations support local livelihoods and cultural traditions.

Recreation has become increasingly popular in the lower portion of the Pecos River Canyon GA, where motorized and non-motorized recreation occur side by side. Motorized vehicles are used for recreation and traditional uses such as gathering products like herbs, Christmas trees, piñon, and fuelwood. Dispersed camping is common in the GA because of motorized access, numerous private inholdings, and recreational residents. Special uses are also common, varying from family reunions and large recreation events, to commercial filming of blockbuster westerns. The Pecos River Canyon GA supports the local economy within and outside the forest by raising revenue from recreation, providing forest products, and providing land for grazing, all of which are integral to traditional culture and livelihoods, and support local tourism through frequent visitation.

Restoration Needs

The upper portions of the Pecos River Canyon GA are key for the restoration and reintroduction of Rio Grande cutthroat trout. This restoration effort includes the installation of fish barriers to mitigate competitive, nonnative fish species (e.g., rainbow and brown trout). Fuel treatments will be implemented to lower the risk of uncharacteristic wildfire as well as protect water quality and quantity. The thinning of dense, small-diameter trees and shrubs in combination with prescribed burning, will support long-range restoration efforts and reinstate natural fire regimes. Restoration will result in decreased woody encroachment of meadows, restored and preserved grasslands, improved watershed health, and greater wildlife diversity.

A single canyon, Holy Ghost Canyon, is home to the only naturally occurring population of the endangered Holy Ghost ipomopsis. The biennial plant has been established in other parts of the Pecos River Canyon in attempts to ensure the resiliency and persistence of the species.

The lower reaches of the canyon would also benefit from vegetation treatments and prescribed burning, particularly adjacent to the wildland-urban interface. Dispersed camping and motorized uses in the lower portion of the GA have resulted in soil compaction and vegetation degradation. Restoration of these areas, such as restrictions and revegetation, is needed in addition to managing popular dispersed camping sites. However, these lower reaches come with unique challenges to restoration efforts. The steep and rocky terrain, as well as a patchwork of private inholdings, limit access for land managers. Despite these challenges, successful restoration of soil and riparian areas (e.g., at the Dalton Campsite) have been completed. Where practical around the wildland-urban interface, there is a need to treat fuels by thinning.

Desired Conditions (GA-PECOSRIV-DC)

1 The Pecos River corridor south of the wilderness boundary, within the Pecos River Canyon Geographic Area, is a high-use region for a diversity of recreation activities (e.g., hiking, fishing, horseback riding, hunting, camping in developed sites, motorized recreation, family reunions, and movie filming) that co-exist without conflict, contribute to the economy of the surrounding communities, and complement more developed recreation opportunities on State-owned land (e.g., New Mexico State Parks properties).

2 The Pecos Wilderness is an exemplary wilderness area that contributes to local recreationists, tourists, commercial users, and traditional users.

3 Bountiful headwaters feed streams, rivers, and acequias while supporting populations of Rio Grande cutthroat trout and are protected from nonnative fish species.

4 Populations of the endangered Holy Ghost ipomopsis are stable and thriving.

5 Partnerships with traditional communities, new residential community members, and established organized groups are collaborative, decrease user conflict, and support both restoration and sustainable recreation opportunities in the forest.

East Sangres

Description

The forested slopes of the East Sangres Geographic Area encompass 137,593 acres of steep granite mesas, lush river-fed meadows, and small streams. The city of Las Vegas lies to the east of the GA and is the largest surrounding community, but several villages lie to the southeast including Bernal, San Jose, San Pablo, San Juan, Mineral Hill, and Colonias. To the east of the GA lie small communities like Mora and the even smaller settlements of Ledoux, Rio de la Casa, Sapello, Panderais, and Rociada. Many small communities, ranches, and farms dot the landscape and comprise the populations that rely on this GA most.

Locals and visitors frequent easily accessible recreation hotspots in the GA like Gallinas Canyon, Barillas Peak, Walker Flats, and Hermit Peak. The viewshed of Jicarillita Peak and Gascon Point are important to surrounding communities. The GA has several grazing operations; while some are large-scale, most are small, family-owned operations that provide income to local families.

Designated areas within the East Sangres GA include:

- Pecos Wilderness (35,055 acres, 18 percent of this Wilderness within the Santa Fe NF is in this GA)
- 10 Inventoried Roadless Areas
    - Bear Mountain (1,382 acres, 100 percent is in this GA)
    - Enchanted Lakes (1,275 acres, 100 percent is in this GA)
    - Falls (2,475 acres, 100 percent is in this GA)
    - Gallinas (13,198 acres, 100 percent is in this GA)
    - Grace Tract (999 acres, 100 percent is in this GA)
    - Lost Lake (469 acres, 100 percent is in this GA)
    - Maestas (474 acres, 100 percent is in this GA)
    - Sparks Creek (80 acres, 100 percent is in this GA)
    - Valle Del Toro (1,861 acres, 100 percent is in this GA)
    - Wesner Spring (583 acres, 98 percent is in this GA)

Management areas within the East Sangres GA include:

- Eligible Wild and Scenic Rivers include:
    - Beaver Creek: Wild (3.1 miles of the Headwaters Gallinas River watershed)

Local Communities and Human Uses

The East Sangres GA is the “backyard” of the city of Las Vegas and the surrounding land grant communities on the east side of the Pecos River. The GA is used primarily by locals for traditional uses like fuelwood gathering, grazing, and dispersed recreation. The forests and private inholdings in this GA, especially surrounding the village of Mora, provide many of the Christmas trees transported throughout New Mexico and surrounding states, like Texas. The primary source of drinking water for the city of Las Vegas, Gallinas Creek, is a municipal watershed that has been the

focus of extensive vegetative restoration efforts throughout the past decade. The Gallinas Creek Canyon is popular for recreation and includes developed camp sites, picnic sites, fishing, and horseback riding opportunities. Though there is less recreational pressure on this GA than other parts of the forest due to relatively remote access, backcountry recreation by locals is common in areas where ATV-accessible fishing and hunting are primary activities (e.g., Cow Creek, Bull Creek, Walker Flats, and Capulin).

Restoration Needs

The East Sangres GA, like much of the Santa Fe NF, is overgrown with an excess of small-diameter, densely packed vegetation. Much of this GA needs forest restoration such as thinning and prescribed burning, as well as efforts to restore and preserve grasslands, such as those on Johnson Mesa. The thinning of dense, small-diameter trees and shrubs in combination with prescribed burning, will support long-range restoration efforts and reinstate natural fire regimes. Restoration will result in decreased woody encroachment of meadows, restored and preserved grasslands, improved watershed health, and greater wildlife diversity.

Desired Conditions (GA-ESAN-DC)

1 The Gallinas watershed supports acequias and provides a sustainable drinking water source for the city of Las Vegas and surrounding communities. Vegetation within this watershed has very low risk of uncharacteristic wildfire.

2 Local access to the forest for cultural and subsistence uses contributes to traditional practices and lifestyles such as livestock grazing, Christmas tree cutting, fuelwood gathering, piñon collecting, medicinal herb collection, wild berry picking, access for recreation (e.g., day hiking, dispersed camping, and wilderness experiences), and supplying the local forestry industry with wood products to support restoration needs.

3 Partnerships with traditional communities and new residential community members are collaborative, decrease user conflict, and support restoration in the forest.

Rowe Mesa and Anton Chico

Description

The Rowe Mesa and Anton Chico Geographic Area includes two noncontiguous areas on the southeastern side of Santa Fe NF. Rowe Mesa and Anton Chico are separated by the Pecos River, with Glorieta Mesa and Hurtado Mesa (locally and collectively referred to as Rowe Mesa) to the west and Anton Chico to the east. The Rowe Mesa and Anton Chico GA includes 117,427 acres of arid terrain that is primarily vegetated by piñon-juniper forests and grasslands, due to its relatively low elevation.

Positioned south of I-25, Rowe Mesa is a prominent land feature, with Anton Chico lying to the east, and the villages of Ilfeld, Rowe, and San Jose to the north. The Rowe Mesa and Anton Chico GA is dominated by piñon-juniper interspersed with large swaths of ponderosa pine forests and shrubs. Grasslands are iconic of this GA, but piñon-juniper encroachment on wide-spanning grasslands has demanded aggressive restoration efforts. The GA also has grazing operations, including numerous small, family-owned grazing operations that provide income to local families.

Designated areas within the Rowe Mesa and Anton Chico GA include:

- 1 Inventoried Roadless Area
  - Ladrones Mesa RNA (701 acres, 100 percent is in this GA)
- 2 Scenic Byways
  - Route 66 Pre-1937 Alignment (2 miles, 41 percent of this scenic byway within the Santa Fe NF is in this GA)
  - Old Santa Fe Trail (5 miles, 66 percent of this scenic byway within the Santa Fe NF is in this GA)
- 1 Research Natural Area
  - Mesita De Los Ladrones, Research Natural Area (629 acres, 100 percent is in this GA)

Management areas within the Rowe Mesa and Anton Chico GA include:

- Mesita de los Ladrones Research Natural Area
- Eligible Wild and Scenic Rivers include:
  - Pecos River: Scenic (6.8 miles of the Tecolote Creek - Pecos River watershed)

Local Communities and Human Uses

The Rowe Mesa and Anton Chico GA provides abundant small forest products like latillas, fuelwood, and piñon, as well as plentiful opportunities for hunting big game and turkey. Roads braided across the GA illustrate the high volume of locals enjoying this GA for motorized recreation, often accompanied by year-round recreational shooting, hunting, and fuelwood gathering. Small grazing operations use this GA throughout the year, and occasionally, military exercises occur.

Restoration Needs

Piñon pine forests and juniper woodlands throughout the Rowe Mesa and Anton Chico GA require restoration such as thinning and burning to restore and preserve grasslands. These restoration efforts will support continued access for traditional uses, recreation, and grazing by surrounding local communities. The thinning of dense, small-diameter trees and shrubs in combination with prescribed burning will support long-range restoration efforts and reinstate natural fire regimes. Restoration will result in decreased woody encroachment of meadows, restored and preserved grasslands, improved watershed health, and greater wildlife diversity.

Desired Conditions (GA-RMAC-DC)

1 Grasslands, piñon pine forests, and juniper woodlands have restored productivity, reintroduced fire, and are free from meadow encroachment.

2 Restored and productive ERUs contribute to wildlife habitat and traditional uses for local communities accessing forest products and sustainably grazing livestock.

3 Local, traditional, and subsistence uses (e.g., piñon picking, firewood gathering, livestock grazing, and recreation) occur almost year-round in lower-elevation areas.

Chapter 5. Forest Plan Monitoring Program

Monitoring provides feedback for the forest planning cycle by testing assumptions, tracking relevant conditions over time, measuring management effectiveness, and evaluating effects of management practices. Monitoring information should enable the responsible official to determine if a change in plan components or other plan content that guides management of resources on the plan area may be needed, forming a basis for continual improvement and adaptive management. Direction for the monitoring and evaluation of forest plans is found under the 2012 Planning Rule at 36 CFR 219.12. Under the 2012 Planning Rule, monitoring consists of two elements: the plan monitoring program developed by the forest, and broader-sale monitoring strategies developed by the Regional Forester.

The plan monitoring program addresses the most critical components to inform management of the forest's resources (see table 5). Every monitoring question links to one or more desired condition, objective, standard, or guideline. Not every plan component has a corresponding monitoring question due to financial and technical constraints of the agency. Monitoring questions are chosen to provide the information necessary to evaluate whether plan components are effective and appropriate, and whether management is being effective in maintaining or achieving progress toward the desired conditions and objectives for the plan area. Indicators are specific resource measures that provide quantitative or qualitative measurements and can show trends in conditions that are relevant to the monitoring questions. A monitoring implementation guide (to be developed after this forest plan is finalized) will provide more detailed information and methodology on how to implement the monitoring program, including monitoring protocols, frequency, data sources, and storage.

In addition to the requirements above, a plan monitoring program must contain one monitoring question and associated indicators to address each of the nine following elements. These are the minimum monitoring requirements as specified in the 2012 Planning Rule (36 CFR 219.12(a)(5))**:**

i. The status of select watershed conditions.

ii. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.

iii. The status of focal species to assess the ecological conditions required under § 219.9.

iv. The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.

v. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.

vi. Measurable changes in the plan area related to climate change and other stressors that may be affecting the plan area.

vii. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple-use opportunities.

viii. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).(36 CFR 219.12(a)

ix. Address the plan contributions to communities, social and economic sustainability of communities, multiple-use management in the plan area, or progress toward meeting the desired conditions and objectives related to social and economic sustainability (FSH 1909.12, Chapter 30, section 32.13f).

A biennial monitoring evaluation report is prepared to help indicate whether a change to the forest plan or the monitoring program is warranted based on the new information, whether a new assessment may be needed, or whether there is no need for change at that time. The biennial monitoring evaluation does not need to evaluate all questions or indicators on a biennial basis, but must focus on new data and results that provide information regarding management effectiveness. The monitoring evaluation report will be made available to the public.

This monitoring program is not intended to depict all monitoring, inventorying, and data-gathering activities undertaken in the forest; nor is it intended to limit monitoring to just the questions and indicators listed in this chapter of the plan. Consideration and coordination with broader-scale monitoring strategies; multi-party monitoring collaboration; and cooperation and coordination with other agencies, organizations, and individuals where practicable will increase efficiencies and help track changing conditions beyond the forest boundary. Project and activity monitoring may also be used to gather information for the plan monitoring program.

The proposed monitoring program for the expected 10- to 15-year lifespan of the final forest plan is depicted in table 5. The table is separated by resource areas and lists desired conditions and plan components applicable to answering the monitoring question. Indicators that will be able to discern movement toward desired conditions and assess how the management practices are affecting the resource are also listed. The table also lists the required elements (see above) that are covered by the monitoring question and the frequency at which monitoring is anticipated to occur.

Table 5. Forest plan monitoring program for the Santa Fe NF

Watersheds, Air Quality, and Soils

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Watersheds **Desired Condition:** Watersheds are functioning properly. **Desired Condition:** Water quality across the forest meets or exceeds the State's water quality standards and provides for the attainment of designated uses. **Objective:** Complete projects that improve conditions in at least 2 "impaired" or "functioning-at-risk" watersheds every 10 years. **Objective:** Over 10 years, improve watershed function by decommissioning or mitigating impacts (e.g., maintenance, reroutes, or improvements) to 100 miles of routes (e.g., system roads, unauthorized routes or trails) to the point of restoring hydrologic and ecological function. **Standard:** Best management practices must be used to minimize management impacts to maintain water quality.	Are management activities maintaining or improving watershed function and implementing best management practices to minimize impacts and improve water quality?	Percentage of forest watersheds in proper functioning condition Number of acres treated that improve watershed condition and ecological function (e.g., watershed health in WCC Framework) Number of fully implemented and fully effective best management practice evaluations versus unimplemented and ineffective best management practice evaluations Miles of decommissioned or improved roads.	(i), (vii)	5 years
Air Quality **Desired Condition**: Air quality meets or surpasses New Mexico and Federal ambient air quality standards. **Desired Condition:** Water chemistry and biotic components are not impacted by atmospheric deposition of pollutants. **Desired Condition:** Visibility in designated Wilderness Area is free of human-caused impacts.	Are all prescribed and managed wildfires conducted in accordance with state air quality regulations governing prescribed and managed wildfires?	Particulate matter Visibility	(i), (ii)	Annually

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Soils **Desired Condition:** Soil productivity, function, and inherent physical, chemical, and biological processes remain intact or are enhanced. Soils can readily absorb, store, and transmit water vertically and horizontally; accept, hold, and release nutrients; and resist erosion. **Desired Condition:** Vegetative cover and litter are distributed across the soil surface in adequate amounts to limit erosion and contribute to soil deposition and development. Soil cover and herbaceous vegetation protect soil, facilitate infiltration, and contribute to plant and animal diversity and ecosystem function. **Standard:** Best Management Practices, FSH 2509.18 - Soil Management Handbook must be used to minimize management impacts to ensure long-term soil productivity and condition. **Guideline:** Ground-disturbing management activities should be designed to minimize short- and long-term adverse impacts to soil resources. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed. When soil conditions are less than satisfactory as a result of management activities, restoration of soil condition should occur.	Are management actions maintaining or improving soil (ground) cover, contributing to improved soil condition? Are management actions resulting in significant changes to the productivity of the land?	Soil Condition Rating Ground cover percent and plant species composition Watershed condition framework soil indicator – percent improving	(vii), (viii), (ii)	3 to 5 years

Ecological Processes and Conditions for Terrestrial and Aquatic Ecosystems

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Riparian Areas **Desired Condition:** Vegetation composition and structure within riparian areas consists of appropriate plant species and seral state proportions. **Objective:** Move toward desired conditions for riparian vegetation types that are outside or trending away from their natural range of variability by restoring the composition and structure of 100 acres of impaired riparian or wetlands every 5 years. **Objective:** Treat and control invasive species on at least 2 stream reaches every year, with an objective of 10 miles treated every 10 years. **Guideline:** Management activities should maintain or improve the age class distribution and diversity of native riparian plant species, thereby providing habitat for wildlife in wetland and riparian areas.	1. Are management actions maintaining or moving riparian vegetation toward desired conditions?	Key indicators from the Watershed Condition Framework: condition class, biota, and habitat. Plant species composition and structure Acres of impaired riparian vegetation restored Residual vegetation	(ii), (vii)	Annually

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Riparian Habitat *Focal Species*: Rio Grande cutthroat trout, northern leopard frog, plumbeous vireo (below 7,500 feet), Cordilleran flycatcher (above 7,500 feet) **Desired Condition**: Aquatic habitats and water bodies (e.g., lakes, ponds, reservoirs) support a complete assemblage of native aquatic species and are resilient to natural and human disturbances including projected warmer and drier climatic conditions. **Objective:** Complete aquatic restoration on priority projects that restore 30 miles of aquatic habitat (e.g., increase pool quantity, provide stream cover, remove or install of fish barriers, restore beaver populations, treat invasive aquatic species, etc.) every 10 years to benefit aquatic species.	Are forest management activities within riparian areas increasing biodiversity or populations of riparian obligate species?	Management activity impacts on abundance and distribution of riparian obligate focal species: cutthroat trout, northern leopard frog, plumbeous vireo (below 7,500 feet) and Cordilleran flycatcher (above 7,500 feet).	(iii)	2 to 3 years
Aquatic Habitats **Desired Condition:** Aquatic habitats are distributed across the forest in sufficient quantity and with appropriate habitat components to support self-sustaining populations of native fish and other aquatic species. **Objective:** Complete aquatic restoration on priority projects that restore 30 miles of aquatic habitat (e.g., increase pool quantity, provide stream cover, remove or install fish barriers, restore beaver populations, treat invasive aquatic species, etc.) every 10 years to benefit aquatic species. **Guideline**: Except where barriers are beneficial and necessary to achieve conservation goals for aquatic species, fragmentation of aquatic habitats and isolation of aquatic species should be avoided and passage for aquatic organisms should be maintained. **Guideline:** Management of cold-water streams should include adequate vegetation cover and width-to-depth ratio to move toward State of New Mexico standards for stream water temperatures for "High Quality Coldwater" systems.	Is aquatic habitat distributed, connected, and in a condition capable of supporting native aquatic species?	Miles of aquatic habitat restored Stream temperature Number of beneficial barriers created and number of harmful barriers removed Large woody debris Presence of endemic, at-risk, or appropriate indicator species	(ii), (vi), (vii)	2 to 3 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Terrestrial Habitats **Desired Condition:** Terrestrial ecosystems are composed of appropriate assemblages of sustainable populations of plant and animal species that are supported by healthy ecosystems. **Desired condition**: Habitat configuration, connectivity, and availability allow wildlife populations to adjust their movements in response to major disturbances (e.g., climate change or uncharacteristic fire) and promote genetic flow between wildlife populations. **Objectives:** Maintain, improve, or install at least one water feature per year to improve water availability for wildlife where natural water sources are limited. This may be done in conjunction with water features for range. **Objective:** Restore or enhance at least 50,000 acres of terrestrial wildlife habitat during each 10-year period of the life of the plan.	Are management activities moving terrestrial habitats toward desired conditions?	Vegetation species structure, density, and composition Acres of terrestrial habitat restored or enhanced; range vegetation improved Number of water features maintained, improved, or installed for wildlife benefit Presence of endemic, at-risk, or appropriate indicator species	(ii), (vi), (vii)	2 to 3 years
Wildlife Connectivity –Aquatic and Terrestrial Habitats *Focal Species:* American beaver **Desired Conditions:** Aquatic habitats are connected and free from alterations (e.g., temperature regime changes, lack of adequate streamflow, or barriers to aquatic organism passage) to allow for species migration, connectivity of fragmented populations and genetic exchange. Barriers to movement are located where necessary to protect native fish from nonnative species. Habitat configuration, connectivity, and availability allow wildlife populations to adjust their movements in response to major disturbances (e.g., climate change or uncharacteristic fire) and promote genetic flow between wildlife populations.	Are aquatic and terrestrial habitats connected and do they provide the necessary ecological conditions to allow animals to move freely about the forest?	Distribution of American beaver	(ii), (iii), (vii)	2 to 3 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
<u>Woodland and Grassland Ecosystems</u> *Highly departed non-forested ERUs are juniper grass (JUG), piñon juniper grass (PJG), Colorado Plateau Great Basin grassland (CPGB), sagebrush shrubland (SAGE), and montane subalpine grassland (MSG). **Desired Condition:** Ecosystems maintain all of their essential components, processes, and functions. **Desired Condition:** Ecosystems are productive, sustainable, resilient, and adaptive to disturbances and provide goods and services over the long-term despite changing and uncertain future environmental conditions. **Desired Condition:** The ecological attributes and processes that provide habitat for native biota and/or historic and cultural values are maintained. **Objectives:** Over a 10-year period, complete 2,500 to 50,000 acres of combined vegetation treatments in highly departed non-forested ERUs* to move vegetation toward desired conditions (i.e., restoration). Treatments may include mechanical treatments, prescribed fire or naturally ignited wildfires, seeding, or other techniques still to be determined by best available science depending on the specific ERU. **Management Approach:** Consider management actions that replicate natural disturbance regimes.	Are management practices moving woodland and grassland vegetation systems with plan objectives (JUG, PJG, CPGB, SAGE, and MSG) toward desired conditions and increasing their resilience to future disturbances?	Vegetation species structure, density, and composition Ground cover (%) of native species Acres of tree encroachment removal Acres of restoration treatments implemented	(ii), (vii), (vi)	2 to 3 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Forested Ecosystems **Desired Condition:** Vegetative conditions (composition, structure, and function) are broadly resilient to disturbances of varying frequency, extent, and severity. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g., insects, diseases, fire, and wind), including old trees, downed logs, and snags. Fire and other disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. **Desired Condition:** Ecosystems are productive, sustainable, resilient, and adaptive to disturbances and provide goods and services over the long term, despite changing and uncertain future environmental conditions. **Desired Condition:** Restoration and fuel treatments result in ecological resources that are adaptable to changing climate conditions. **Objectives:** Treat between 60,000 to 280,000 acres of MCD and between 165,000 and 350,000 acres of PPF using mechanical treatments and fire (prescribed and natural ignitions) over 10 years. **Management Approach:** In areas of high vulnerability to climate change, consider increasing resiliency by using a diversity of treatments to facilitate natural adaptation to changing conditions such as, managing in favor of early- to mid-seral species over late-seral species in ecotones, as species characteristics of lower life zones are adapted for warmer and drier conditions. Consider managing tree basal area at the low end of the range of desired conditions to mitigate water stress.	Are management practices moving ponderosa pine (PPF) and dry mixed-conifer (MCD) forests toward desired conditions and increasing their resilience to future disturbances?	Vegetation species structure, density, and composition Acres of Insect and Disease Infestations Acres of fuel and restoration treatments	(ii), (vii), (vi)	2 to 5 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Ponderosa Pine *Focal Species*: Northern goshawk **Desired Condition:** The PPF vegetation community is composed of trees of varying ages in a mosaic of seral stages and structures. The forest arrangement on the landscape is similar to historic patterns, with groups and patches generally of variably-sized and aged trees (uneven-aged) and occasional patches of even-aged structure, interspersed within variably-sized openings of grass/forb/shrub vegetation associations. Denser stand conditions exist in some locations, such as north-facing slopes and canyon bottoms. (See FW-PPF-DC-1a for detailed seral states) **Guideline:** The forest should use the most current ecological guidelines to improve nesting conditions for goshawk (*Accipiter gentilis*): (a.) A minimum of three goshawk nest areas and three replacement nest areas should be located per goshawk territory. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (northwest to northeast) aspects. Nest areas should generally be 25 to 30 acres in size. (b.) Goshawk post-fledging areas of approximately 420 acres in size should be designated surrounding nest sites. (c.) In goshawk foraging areas and post-fledging family areas, groups of three to five reserve trees should be retained within management-created openings greater than 1 acre in ponderosa pine-evergreen oak, and dry mixed-conifer communities, and six reserve trees should be retained within management-created openings greater than 0.5 acre in wet mixed-conifer and spruce-fir communities. (d.) In occupied goshawk nest areas, human presence should be minimized between March 1 and September 30 (per Guideline 1a in this section).	Are conditions within ponderosa pine systems providing the structural components that are representative of reference seral state conditions?	Management activity impacts on abundance and distribution of focal species northern goshawks in upland forests.	(iii), (iv)	2 to 3 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Piñon juniper woodlands *Focal Species*: Juniper titmouse **Desired Condition:** Persistent piñon-juniper woodlands consist of even-aged patches of piñons and junipers that at the landscape level form multi-aged woodlands. Very old trees (more than 300 years old) are present. (Table with detailed seral state included.) **Guideline:** In areas that produce piñon seeds, mitigation measures for the collection of forest products (e.g., collection of dead or down; tree diameter restrictions, restrict size of fuelwood area) should be used to reduce impacts to piñon-producing trees and benefit at-risk species. **Guideline:** Even-aged management treatments in piñon-juniper habitat should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands for foraging habitat of at-risk species.	Are conditions within piñon-juniper systems providing the ecological conditions that are representative of reference seral state conditions (e.g., structural components, percent canopy, and composition)?	Management activity impacts on abundance and distribution of focal species juniper titmouse in piñon-juniper.	(iii)	2 to 3 years
<u>Invasive Species</u> **Desired Condition:** Invasive species are nonexistent or exist at population levels that do not disrupt ecological functioning, affect the sustainability of native species, cause economic harm, or negatively impact human health. **Objective:** Eradicate or suppress invasive plant species on at least 600 acres annually. **Standard:** Forest management actions must apply best management practices to minimize the introduction or spread of invasive species.	What is the status and trend of invasive plant species in the plan area?	Acres of invasives treated Acres of invasives inventoried BAER report findings	(ii), (vi), (vii)	Annually

*Monitoring topics:

i. Status of select watershed conditions.
ii. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
iii. Status of focal species to assess the ecological conditions required under § 219.9.
iv. Status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
v. Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
vi. Measurable changes in the plan area related to climate change and other stressors that may be affecting the plan area.
vii. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple-use opportunities.
viii. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).(36 CFR 219.12(a)
ix. Address the plan contributions to communities, social and economic sustainability of communities, multiple-use management in the plan area, or progress toward meeting the desired conditions and objectives related to social and economic sustainability (FSH 1909.12, Chapter 30, section 32.13f).

Fire and Fuels

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Desired Condition: Wildland fire protects, maintains, and enhances resources and moves ecosystems toward desired conditions on a landscape scale. It is allowed to function in its natural ecological role on a landscape scale and across administrative boundaries, under conditions where safety and values at risk can be protected. **Desired Condition:** Wildland fires burn within the range of severity and frequency of historic fire regimes for the affected vegetation communities. High-severity fires rarely occur where they were not historically part of the fire regime. **Objective:** Reduce the potential for active crown fire and restore frequent fire by improving mixed conifer-frequent fire forests that are outside or trending away from their natural range of variability by annually treating 6,000 to 28,000 acres on average through the use of wildland fire (natural and prescribed), mechanical (e.g., thinning or timber harvest), planting, or other methods that would accomplish this objective and move toward desired conditions. **Objective:** Reduce the potential for active crown fire and restore frequent fire by improving ponderosa pine forests that are outside or trending away from their natural range of variability by annually treating 16,500 to 35,000 acres, on average, through the use of wildland fire (natural and prescribed), mechanical (e.g., thinning or timber harvest), planting, or other methods that would accomplish this objective and move toward desired conditions. **Guideline:** Naturally occurring fires should be allowed to perform, as much as possible, their natural ecological role to meet multiple resource objectives and facilitate progress toward desired conditions.	Is wildland fire being used to maintain desired fuel levels and vegetation characteristics, at frequencies and severities consistent with the natural range of variability?	Number and acres of fires managed for multiple objectives by vegetation community and severity Acres of mixed conifer-frequent fire treated Acres of ponderosa pine forest treated Burn severity mapping following fires (prescribed and natural starts)	(ii), (vii)	1 to 2 years

Species Conservation

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Desired Condition: Ecological conditions contribute to the survival and recovery of federally listed, proposed, and candidate species; preclude the need for listing new species; and allow for the recovery and persistence of species of conservation concern. **Guideline:** Project activities and special uses occurring within federally-designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved USFWS recovery plan. Deviation from recovery plans may occur through consultation with USFWS.	Are forest management activities and/or natural events affecting the ecological conditions that contribute to the recovery of the federally listed species?	Endangered species-specific habitat requirements Management actions completed to improve habitat (acres improved)	(iv)	2 to 3 years

*Monitoring topics:

i. Status of select watershed conditions.
ii. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
iii. Status of focal species to assess the ecological conditions required under § 219.9.
iv. Status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
v. Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
vi. Measurable changes in the plan area related to climate change and other stressors that may be affecting the plan area.
vii. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple-use opportunities.
viii. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).(36 CFR 219.12(a)
ix. Address the plan contributions to communities, social and economic sustainability of communities, multiple-use management in the plan area, or progress toward meeting the desired conditions and objectives related to social and economic sustainability (FSH 1909.12, Chapter 30, section 32.13f).

Designated Areas and Progress toward Meeting Recreation Objectives

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Developed sites **Desired Condition:** Developed sites meet the expectations of the public within the limits of resource sustainability. **Desired Condition:** Recreation resources and facilities are well maintained and function as intended. Changes in recreation use are appropriate within the recreation setting. **Objective:** At 2 developed recreation sites, accomplish at least 75 percent of deferred maintenance projects every 3 years.	Are developed recreation sites meeting the needs, desires, and expectations of visitors?	Comparison of deferred maintenance costs at start of FY versus actual expenditures on maintenance. NRM database User Surveys Number of campsite reservations	(v)	1 to 3 years
Trails **Desired Condition:** The design, construction, and maintenance of trails are consistent with user desires, enhance the recreation experience, diminish user conflicts, and minimize damage to other resources. **Objective:** Conduct maintenance on at least 25 percent of system trails every 3 years. **Objective:** Verify and correct signage and cartographic accuracy for at least 25 percent of system trails every 3 years. **Objective:** Undertake sustainably designed capital improvements on at least 1 mile (contiguous or not) of poorly-designed trail every three years. **Guideline:** Trails should be sustainably designed and constructed, rerouted, or maintained using current best practices.	Are system trails located and maintained to prevent resource degradation and to support allowable uses? Are system trails meeting the needs, desires, and expectations of multiple users?	Miles of trails maintained Miles of trails accurately mapped and signed Miles of capital improvements on trails Trail user surveys NRM database User Surveys	(v)	3 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Wilderness **Desired Condition:** Wilderness character in designated wilderness areas is retained or restored. **Objective:** Within 10 years of plan approval, wilderness areas show improvement in the four qualities of wilderness character as measured by a 60 percent score or better in upward reporting for Wilderness Stewardship Performance.	Are management activities improving wilderness character in our designated wilderness areas?	Score in Wilderness Stewardship Performance Dispersed campsite monitoring in wilderness areas	(v)	1 to 2 years

Cultural Resources and Traditional Uses

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Desired Condition: Forest resources important for cultural and traditional needs as well as for subsistence practices and economic support of rural historic communities are available and sustainable. **Guideline:** Traditionally used products should be available in the forest to rural historic communities, except in areas with resource concerns or in designated areas where such uses are not allowed, or otherwise restricted by standards or guidelines set forth in other sections of this Plan.	Is the forest providing resources important for subsistence and economic support to rural historic and tribal communities in quantities sufficient to meet their needs?	#of permits sold for: Fuelwood Vigas Collection of plants Latillas Christmas trees Trends in satisfaction Consultations with tribes	(vii), (ix)	Annually

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Fine-filter Desired Condition: Traditional cultural properties, sacred sites, and other locations of traditional and cultural use identified as important to the tribes are unimpaired. **Guideline:** Consultation with federally recognized tribes should occur at the early stages of project planning and design, and Tribal perspectives, needs, and concerns, as well as traditional knowledge, should be incorporated into project design and decisions. **Guideline:** Project activities and uses should be administered in a manner that prevents or minimizes impacts to the physical and scenic integrity of places that the tribes regard as sacred sites, traditional cultural properties, or as part of an important cultural landscape.	Are cultural and historic resources being identified and are mitigation measures taken to provide adequate protections from management actions, looting, and other disturbances? Are projects complying with cultural resources reports?	Number of sites impacted by Federal actions, looting, management actions, and natural disturbances Tribal Consultations and MOU meetings Cultural resource reports completed and complied with	(vii), (ix)	1 to 2 years
Desired Condition: The public has opportunities for learning about, appreciating, and understanding cultural and historic resources as well as resources significant to traditional communities. Public understanding about the past occupation and use of landscapes and cultural resources contribute to their protection.	To what extent is public education and interpretation provided on cultural and historic resources?	Number of interpretive sites Number of interpretive opportunities (talks, tours, activities, etc.) Volunteer hours logged	(v), (vii), (ix)	Annually

Multiple Uses

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Forest Products **Desired Condition:** Forest products are available to businesses and individuals in a sustainable manner that also effectively contributes to watershed health and restoration or maintenance of desired vegetation conditions. **Desired Condition:** Private and commercial timber harvest supplement restoration and maintenance treatments at a scale that achieves landscape desired conditions and contribute to watershed restoration function and resilience, wildlife habitat enhancement, small and large business and employment opportunities, and provide wood products. **Objective:** Provide at least 177,000 CCF per decade to contribute to local forest product industry and for personal use, including 92,850 CCF (72,539 cords) per decade of fuelwood. **Standard:** On lands suitable for timber production, timber harvest intended to create openings for tree regeneration shall only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest. **Standard:** The sale of timber shall be equal to or less than the quantity that can be removed annually in perpetuity on a sustained-yield basis with the following exceptions: vegetation departures, salvage and sanitation harvests, and annual removals that may exceed sustained yield limits as long as the decadal average is within annual sustained-yield parameters.	Are outputs of timber and other forest products being produced at a rate consistent with projections and in quantities sufficient to meet needs for personal use and local timber industries?	CCF provided for industry CCF for fuelwood Sales to be offered % of regeneration harvests restocked in 5 years Amount of timber harvested relative to annual amount allowed for sustainable-yield, and according to PTSQ/ PWSQ.	(vii), (ix)	5 years

Selected Plan Components	Monitoring Questions	Indicators	9 Monitoring Topics*	Monitoring Frequency
Sustainable livestock grazing **Desired Condition:** Sustainable livestock grazing contributes to the long-term socioeconomic diversity and stability of local communities, and cultural identity tied to traditional uses. **Objective:** Annually remove, improve, or reconstruct at least 5 percent of the forest's range infrastructure that is no longer necessary or in poor or non-functional condition. **Guideline:** Vacant or understocked allotments should be made available to permitted livestock for pasture during times or events when other active allotments are unavailable and require ecosystem recovery as a result of natural disturbances (e.g., wildfire) or management activities (e.g., vegetation restoration treatments).	Is the forest moving toward desired condition by providing grazing opportunities in support of our local economies?	Level of permitted livestock grazing (AUM) Number of closed and vacant allotments Number of acres of rangeland vegetation improved Allotments administered to standard Percent of range infrastructure improved.	(vii), (ix)	Annually

*Monitoring topics:

i. Status of select watershed conditions.
ii. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
iii. Status of focal species to assess the ecological conditions required under § 219.9.
iv. Status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
v. Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
vi. Measurable changes in the plan area related to climate change and other stressors that may be affecting the plan area.
vii. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple-use opportunities.
viii. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).(36 CFR 219.12(a)
ix. Address the plan contributions to communities, social and economic sustainability of communities, multiple-use management in the plan area, or progress toward meeting the desired conditions and objectives related to social and economic sustainability (FSH 1909.12, Chapter 30, section 32.13f).

List of Preparers

Except where indicated, all specialists below were employees of the Santa Fe NF. Many others not included in the list below made significant contributions to the development of the final forest plan including district specialists, detailers (short-term employees of 2 to 4 months), and Regional Office employees. In addition, comments from the public and Cooperating Agencies played a crucial role in shaping the document.

Shout out to the Planning Teams from the Carson and Cibola NFs. Thanks guys, it's been a journey.

Interdisciplinary Team

Erin Barton, Forest Planner

Devin Black, Planning Ecologist

Abie Carabajal, Planning Ecologist

Charles Clark, Collaboration Specialist

Jennifer Cramer, Strategic Planning and Engagement Staff Officer

Jessica Dunn, Designated Areas Planning Specialist

Jonathan Hayden, Planning Specialist for Socioeconomic Resources

Daryl Ratajczak, Wildlife Planner

Extended Team

Raulin Amy, Wildlife Program Manager

Paul Archual, Planning Specialist (detail)

Christine Bishop, Range Program Manager

Mike Bremer, Forest Archaeologist

Sherele Brooks, Student Intern

Dennis Carril, Fuels Program Manager

Mary Emerick, Natural Resource Specialist, Enterprise Program

Bjorn Frederickson, Public Services Staff Officer

Larry Gore, Forest Geologist

Patricia Goude, Writer-editor, Enterprise Program

Mary Greenwood, Recreation Planner, Enterprise Program

Josh Hall, Air and Water Quality Specialist/Liaison with NMED

Nicole Hill, Landscape Architect, Enterprise Program

Hillary Hudson, GIS Specialist

Rebecca Lloyd, Soil and Water Program Lead

Julie Luetzelschwab, GIS Manager

Heidi Klingel, Watershed Specialist, Enterprise Program

Albert Martinez, Forest Engineer

Jason McInteer, Assistant Forest Archaeologist

Reuben Montes, Tribal Relations/ Collaborative Forest Restoration Program /SRS

Dave Park, Soil and Watershed Program Manager

Ken Reese, Silviculturist

Cecil Rich, Fish and Aquatic Program Manager

Jessica Richardson, Collaboration Specialist (detail)

Karen Yori, Recreation Program Manager

.

Glossary

Acequia or community ditch. A historical community ditch in New Mexico that carries snow runoff, spring flows, or river water to irrigate fields and is administered by a governing board.

Adaptation. Adjustment in natural or human systems to a new or changing environment. Adaptation includes, but is not limited to, maintaining primary productivity and basic ecological functions, such as energy flow; nutrient cycling and retention; soil development and retention; predation and herbivory; and natural disturbances. Adaptation occurs primarily by organisms altering their interactions with the physical environment and other organisms.

Adaptive capacity. The ability of ecosystems to respond, cope, or adapt to disturbances and stressors, including environmental change, to maintain options for future generations. As applied to ecological systems, adaptive capacity is determined by:

1. Genetic diversity within species in ecosystems, allowing for selection of individuals with traits adapted to changing environmental conditions.
2. Biodiversity within the ecosystem, both in terms of species richness and relative abundance, which contributes to functional redundancies.
3. The heterogeneity and integrity of ecosystems occurring as mosaics within broader-scaled landscapes or biomes, making it more likely that some areas will escape disturbance and serve as source areas for re-colonization.

Adaptive management. Adaptive management is the general framework encompassing the three phases of planning: assessment, plan development, and monitoring (36 CFR 219.5). This framework supports decision-making that meets management objectives while simultaneously accruing information to improve future management by adjusting the plan or plan implementation. Adaptive management is a structured, cyclical process for planning and decision-making in the face of uncertainty and changing conditions with feedback from monitoring, which includes using the planning process to actively test assumptions, track relevant conditions over time, and measure management effectiveness.

All lands is the concept that ecosystems transcend land ownership boundaries, thus, effective land management requires cooperation and collaboration among the Forest Service, other land managing agencies, federally recognized tribes, and private landowners. This plan was developed using an approach that considers the greater landscape and the Santa Fe NF's ecological, social, and economic role in that landscape.

Alpine fell-field. Areas on alpine slopes where cycles of freezing and thawing (frost events) and wind create niche habitats for plants within small interspaces in rocks and scree (Cooper et al. 1997).

Airshed. A geographic area that, because of topography, meteorology, and/or climate is frequently affected by the same air mass.

Assessment. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook, an assessment is the identification and evaluation of existing information to support land management planning. Assessments are not decision-making documents, but provide current information on select topics relevant to the plan area, in the context of the broader landscape (36 CFR 219.19).

At-risk species are federally recognized as endangered, threatened, proposed, and candidate species, or species of conservation concern (SCC). SCCs are species other than federally recognized threatened, endangered, proposed, or candidate species known to occur on the Santa Fe NF and for which the Regional Forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long term in the forest. For SCC, habitat management and compatible multiple uses will be accomplished in a way that ensures species' persistence on the Santa Fe NF, in accordance with the 2012 Planning Rule (36 CFR § 219.9(b)). For many at-risk species, essential ecological conditions can be provided through "coarse filter" plan components, such as desired conditions and standards and guidelines, for specific vegetation communities (e.g., ALP, MCD, PJO). These may be adequate to ensure persistence of at-risk species and maintain viable populations on the Santa Fe NF. For other at-risk species, fine-filter plan components that are species-specific (timing restrictions, etc.) may be required to ensure persistence. In this forest plan, at-risk species associated with a vegetation community (see ERUs) are listed after plan components, but are not in a text box, since their identification is not a forest plan decision, as are plan components. At-risk species can be changed based on new scientific information throughout the life of the forest plan, without an amendment (FSH 1909.12, 21.22b).

Authorized livestock numbers. Year to year actual stocking of livestock on a grazing allotment, based on forage and water availability, condition of range improvements, climatic conditions, personal convenience for the permittee, or resource protection. Authorized numbers are not necessarily the number on the permit.

Basal area**.** The cross-sectional area at breast height (4.5 feet above the ground) of trees measured in square feet. Basal area is a way to measure how much of a site is occupied by trees.

Best management practices (BMPs). Methods, measures, or practices selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (36 CFR 219.19).

Biological soil crusts. Crusts of soil particles formed by living organisms (such as algae, mosses, lichens) in arid areas. They hold soil in place, help retain moisture, and improve soil nutrients by fixing atmospheric nitrogen.

Broader landscape. For land management planning pursuant to 36 CFR 219, the plan area and the lands surrounding the plan area. The spatial scale of the broader landscape varies depending upon the social, economic, and ecological issues under consideration.

Candidate species (36 CFR 219.19).

1. For species under the purview of the U.S. Fish and Wildlife Service (USFWS), a species for which the USFWS possesses sufficient information on vulnerability and threats to support a proposal to list as endangered or threatened, but for which no proposed rule has yet been published by the USFWS.
2. For species under the purview of the National Marine Fisheries Service (NMFS), a species that is:

The subject of a petition to list as a threatened or endangered species and for which the (NMFS) has determined that listing may be warranted, pursuant to section 4(b)(3)(A) of the Endangered Species Act (16 U.S.C. 1533(b)(3)(A)), or

Not the subject of a petition but for which the (NMFS) has announced in the Federal Register the initiation of a status review.

Canopy cover. The proportion of the forest floor covered by the vertical projection of the tree crowns (Jennings et al. 1999). Canopy cover is measured using a variety of methods including spherical densiometers, funnels, moose horns, aerial photographs, and hemispherical images. Canopy cover is also known as forest canopy cover; crown cover.

Catastrophic fire. Catastrophic fire can be defined from three different perspectives: economic (the cost of damage), social (how it is viewed by the public), and ecological (biological effects of the fire) (Carey and Schumann 2003). Covington and Moore (1994) defined catastrophic fire as a fire that kills a majority of the trees in the canopy in the ponderosa pine type or in any dry forest that was, in presettlement times, subject to frequent surface fires.

Climate change. A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onward and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. Climate change is addressed throughout this plan, indirectly through desired conditions in the form of functional ecosystems and resilient landscapes, and directly through management approaches and the monitoring plan where appropriate. This plan is designed around strategies that are responsive to an uncertain and changing climate, including maintaining and restoring resilient native ecosystems; adaptive management; anticipating increased disturbance; increasing water conservation and planning for reduced supply; and anticipating increased recreational use (increased number of summer visitors and extended summer season of use).

Coarse woody debris (CWD). Fallen dead trees and the remains of large branches on the ground in forests and in rivers or wetlands.

Collaboration or collaborative process. A structured manner in which a collection of people with diverse interests share knowledge, ideas, and resources, while working together in an inclusive and cooperative manner toward a common purpose. Collaboration, in the context of the land management planning regulation at 36 CFR part 219 and this Handbook, falls within the full spectrum of public engagement described in the Council on Environmental Quality's publication of October 2007: Collaboration in NEPA – A Handbook for NEPA Practitioners (36 CFR 219.19).

Community Wildfire Protection Plan (CWPP). A comprehensive community-based planning and prioritization approach for protection of life, property, and critical infrastructure in the wildland-urban interface. Protection plans may take a variety of forms based on the needs of the community, but must be collaboratively developed, identify and prioritize areas for hazardous fuel reduction treatments, recommend treatment types and methods, and recommend measures that homeowners and communities can take to reduce the ignitability of structures. The planning process may also identify management options and implications in the surrounding landscape. The Healthy Forests Restoration Act (HFRA) of 2003 instructed the US Forest Service to give consideration of community priorities as outlined in a CWPP during planning and implementation of hazardous fuel reduction projects.

Connectivity. Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long distance range shifts of species, such as in response to climate change (36 CFR 219.19).

Conservation. The protection, preservation, management, or restoration of natural environments, ecological communities, and species (36 CFR 219.19).

Conserve. For the purpose of meeting the requirements of 36 CFR 219.9, to protect, preserve, manage, or restore natural environments and ecological communities to potentially avoid Federal listing of proposed and candidate species (36 CFR 219.19).

Critical habitat. For a threatened or endangered species, (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (ESA) (16 U.S.C. 1533), on which are found those physical or biological features (a) essential to the conservation of the species, and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the ESA (16 U.S.C. 1533), upon a determination by the Secretary that such areas are essential for the conservation of the species. ESA, sec. 3 (5)(A), (16 U.S.C. 1532 (3)(5)(A)). Critical habitat is designated through rulemaking by the Secretary of the Interior or Commerce. ESA, sec. 4 (a)(3) and (b)(2) (16 U.S.C. 1533 (a)(3) and (b)(2)).

Cumulative effects or impacts. The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions that have taken place over a period of time.

Decommission. Treated in such a manner so as to no longer function as intended. Usually in reference to decommissioning of a road so that it no longer is apparent on the landscape.

Defensible space. An area either natural or manmade where material capable of allowing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and property or resources. In practice, “defensible space” is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Departure. The degree to which the current condition of a key ecosystem characteristic is unlike the reference condition.

Designated area. An area or feature identified and managed to maintain its unique special character or purpose. Some categories of designated areas may be designated only by statute and some categories may be established administratively in the land management planning process or by other administrative processes of the Federal executive branch. Examples of statutorily designated areas are national heritage areas, national recreational areas, national scenic trails, wild and scenic rivers, wilderness areas, and wilderness study areas. Examples of administratively designated areas are experimental forests, research natural areas, scenic byways, botanical areas, and significant caves (36 CFR 219.19).

Decision document. A record of decision, decision notice, or decision memo (36 CFR 220.3).

Designated road, trail, or area. A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to 36 CFR 212.51 on a motor vehicle use map (36 CFR 212.1).

Desirable nonnative. Nonnative species that were intentionally released into the wild to establish self-sustaining populations of wildlife that meet public demands for recreation or other purposes (e.g., sport fishes). These desirable nonnative species are not likely to cause ecosystem disruption.

Desired conditions reflect either natural or desired variation in the composition and structure within a community or resource area. Desired conditions may or may not be the same as historic conditions and may have wide ranges of values due to spatial variability in soils, elevation, aspect, or social values. For the purposes of the land management planning regulation at 36 CFR 219, desired conditions give a description of specific social, economic, and/or ecological characteristics of the plan area (or a portion of the plan area) toward which management of the land should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be quantified, but do not include completion dates (36 CFR 219.7(e)(1)(i)). Desired conditions are achievable, and may reflect social, economic, or ecological attributes, including ecosystem processes and functions.

Disturbance. Any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and/or function and changes resources, substrate availability, or the physical environment (36 CFR 219.19).

Disturbance regime. A description of the characteristic types of disturbance on a given landscape; the frequency, severity, and size distribution of these characteristic disturbance types; and their interactions (36 CFR 219.19).

Diversity. An expression of community structure: high if there are many equally abundant species, low if there are only a few equally abundant species. The distribution and abundance of different plant and animal communities and species within the area covered by a land management plan.

Easement. A type of special-use authorization (usually granted for linear rights-of-way) that is utilized in those situations where a conveyance of a limited and transferable interest in National Forest System land is necessary or desirable to serve or facilitate authorized long-term uses, and that may be compensable according to its terms (36 CFR 251.51).

Ecological conditions. The biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Ecological conditions include habitat and other influences on species and the environment. Examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species (36 CFR 219.19).

Ecological integrity. The quality or condition of an ecosystem when its dominant ecological characteristics (e.g., composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence (36 CFR 219.19).

Ecological process. The physical, chemical, and biological actions or events that link organisms and their environment including decomposition, production (of plant matter), nutrient cycling, and fluxes of nutrients and energy.

Ecological response unit (ERU). A classification of a unit of land that groups sites by similar plant species composition, succession patterns, and disturbance regimes, such that similar units will respond in a similar way to disturbance, biological processes, or manipulation. Each ERU characterizes sites with similar composition, structure, function, and connectivity, and defines their spatial distribution on the landscape.

Ecological sustainability. See sustainability.

Ecological system. See ecosystem.

Economic sustainability. See sustainability.

Ecosystem. (36 CFR 219.19) A spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its:

Composition. The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.

Structure. The organization and physical arrangement of biological elements, such as, snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.

Function. Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances, such as wind, fire, and floods.

Connectivity. See connectivity above.

Ecosystem diversity. The variety and relative extent of ecosystems (36 CFR 219.19).

Ecosystem integrity. See ecological integrity.

Ecosystem Services are those products and processes in functional ecosystems that people enjoy or from which they benefit. The description of each resource in the plan includes a discussion of the ecosystem services that it provides. Benefits that people obtain from ecosystems may be grouped into four broad categories:

1. *Supporting* ecosystem services are those that are necessary for the production of other ecosystem services, such as pollination, seed dispersal, soil formation, and nutrient cycling.

2. *Regulating* ecosystem services are the benefits people obtain from the regulation of ecosystem processes, such as long-term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood and drought control; and disease regulation.

3. *Provisioning* ecosystem services are the products people obtain from ecosystems, such as clean air and fresh water, energy, food, fuel, forage, wood products or fiber, and minerals.

4. *Cultural* ecosystem services are the nonmaterial benefits people obtain from ecosystems such as educational, aesthetic, spiritual, and cultural heritage values, recreational experiences, and tourism opportunities (36 CFR 219.19).

Ecotone. The transition zone between two adjoining ecological communities.

Encroachment. An increase in the density and cover of trees or shrubs in grasslands that reduces grass biomass, density, and cover.

Endangered species. Any species that the Secretary of the Interior or the Secretary of Commerce has determined is in danger of extinction throughout all or a significant portion of its range. Endangered species are listed at 50 CFR sections 17.11, 17.12, and 224.101.

Endemic. (1) Describes a population that has unique genetic characteristics and likely exists in a very limited geographic area. (2) Describes a population of native insects, diseases, plants, or animals that perform a functional role in the ecosystem when they are present at low levels, or constantly attack just a few hosts throughout an area but can become potentially injurious when they increase or spread to reach outbreak (epidemic) levels.

Environmental impacts. Possible adverse effects caused by a development, industrial or infrastructural project, or by the release of a substance in the environment.

Ephemeral stream. A stream that flows only in direct response to precipitation in the immediate locality (watershed or catchment basin), and whose channel is at all other times above the zone of saturation.

Even-aged stand. A stand of trees composed of a single age class (36 CFR 219.19).

Federally listed species. Threatened or endangered species listed under the Endangered Species Act, as amended. Candidate and proposed species are species that are being considered for Federal listing.

Federally recognized tribe. An Indian or Alaska Native Tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian Tribe under the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. 479a (36 CFR 219.19).

Fire intensity. The product of the available heat of combustion per unit of ground and the rate of spread of the fire, interpreted as the heat released per unit of time for each unit length of fire edge. The primary unit is British thermal unit per second per foot (Btu/sec/ft.) of fire front. See also fire severity.

Fire regime. The pattern, frequency, and severity of wildfire that prevails in an area over long periods of time across a landscape and its immediate effects on the ecosystem in which it occurs. The LANDFIRE project classifies fire regimes into five groups based on a combination of fire frequency and fire severity:

Group *	Frequency	Severity	Severity Description
I	0 – 35 years	Low /Mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include Mixed-severity fires that replace up to 75% of the overstory.
II	0 – 35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35 – 200 years	Mixed/Low	Generally mixed-severity; can also include low-severity fires
IV	35 – 200 years	Replacement	High-severity fires
V	200+ years	Replacement/ Any severity	Generally, replacement-severity; can include any severity type in this frequency range

**Table is based on FRCC Guidebook version 3.0, September 2010*.

Fire severity. Degree to which a site has been altered or disrupted by fire; also used to describe the product of fire intensity and residence time; usually defined by the degree of soil heating or mortality of vegetation.

Forested land. Land that is at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use.

Frequent fire-dependent ecosystem. A vegetation community that requires a Fire Regime Group 1 (greater than 35-year fire frequency) to maintain its natural function, structure, and species composition.

Functional ecosystem. A system with intact abiotic and biotic processes. Function focuses on the underlying processes that may be degraded, regardless of the structural condition of the ecosystem. Functionally restored ecosystems may have a different structure and composition than the historical reference condition. As contrasted with ecological restoration that tends to seek historical reference condition, function refers to the dynamic processes that drive structural and compositional patterns. Functional restoration is the manipulation of interactions among process, structure, and composition in a degraded ecosystem to improve its operations. Functional restoration aims to restore functions and improve structures with a long-term goal of restoring interactions between function and structure. It may be, however, that a functionally restored system will look quite different than the reference condition in terms of structure and composition and these disparities cannot be easily corrected because some threshold of degradation has been crossed or the environmental drivers, such as climate, that influenced structural and (especially) compositional development have changed.

Groundcover. The layer of dead and living vegetation that protects topsoil from erosion and drought.

Groundwater-dependent ecosystem. Community of plants, animals, and other organisms whose extent and life processes depend on groundwater. Examples include many wetlands, groundwater-fed lakes and streams, cave and karst systems, aquifer systems, springs, and seeps.

Habitat. The physical location or type of environment in which an organism or biological population lives or occurs.

Habitat fragmentation. The process by which habitat loss results in the division of large, continuous habitats in smaller more isolated remnants.

Habitat type. A land or aquatic unit, consisting of an aggregation of habitats having equivalent structure, function, and responses to disturbance.

Herbivory. Loss of vegetation due to consumption by another organism.

Hydrologic unit code (HUC). A unique hierarchical hydrologic unit based on the area of land that drains to a single stream mouth or outlet at each level, and nested levels are identified by successively longer codes. A HUC 8 sub-basin is 700 square miles or larger and is divided into multiple HUC 10 watersheds that range from 62 to 390 square miles. HUC 12 sub-watersheds are 15 to 62 square miles and nest inside HUC 10 watersheds.

Infill. An increase in trees per acre in forests and woodlands, resulting in a decrease in the quality and size of interspaces.

Information. For information collection from the public pursuant to 5 CFR part 1320, any statement or estimate of fact or opinion, regardless of form or format, whether in numerical, graphic, or narrative form, and whether oral or maintained on paper, electronic or other media. “Information” does not generally include items in the following categories; however, OMB may determine that any specific item constitutes “information”:

1. Affidavits, oaths, affirmations, certifications, receipts, changes of address, consents, or acknowledgments; provided that they entail no burden other than that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument (by contrast, a certification would likely involve the collection of “information” if an agency conducted or sponsored it as a substitute for a collection of information to collect evidence of, or to monitor, compliance with regulatory standards, because such a certification would generally entail burden in addition to that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument);
2. Samples of products or of any other physical objects;
3. Facts or opinions obtained through direct observation by an employee or agent of the sponsoring agency or through nonstandardized oral communication in connection with such direct observations;
4. Facts or opinions submitted in response to general solicitations of comments from the public, published in the Federal Register or other publications, regardless of the form or format thereof, provided that no person is required to supply specific information pertaining to the commenter, other than that necessary for self-identification, as a condition of the agency's full consideration of the comment;
5. Facts or opinions obtained initially or in follow-on requests, from individuals (including individuals in control groups) under treatment or clinical examination in connection with research on or prophylaxis to prevent a clinical disorder, direct treatment of that disorder, or the interpretation of biological analyses of body fluids, tissues, or other specimens, or the identification or classification of such specimens;
6. A request for facts or opinions addressed to a single person;
7. Examinations designed to test the aptitude, abilities, or knowledge of the persons tested and the collection of information for identification or classification in connection with such examinations;
8. Facts or opinions obtained or solicited at or in connection with public hearings or meetings;
9. Facts or opinions obtained or solicited through nonstandardized follow-up questions designed to clarify responses to approved collections of information; and
10. Like items so designated by OMB (5 CFR 1320.3(h)).

Infrastructure. Infrastructure the forest manages includes all vertical and horizontal constructed structures. Infrastructure is broken into three categories:

1. Transportation infrastructure includes both the road and trail systems. The road system infrastructure is all forest roads, drainage ditches, culverts, signage, and bridges. The trail system includes all motorized and non-motorized trails, signage, and bridges.
2. Facilities infrastructure includes administrative and recreation building and sites (e.g., driveways, parking, or landscaping); support utilities (e.g., electrical, water, or wastewater); dams, and other support buildings.

3. Other infrastructure directly supports natural resources, which includes fish barriers, wildlife drinkers, and range infrastructure (e.g., fencing, trick tanks, water gaps, or cattleguards).

Inherent capability of the forest. The ecological capacity or ecological potential of an area characterized by the interrelationship of its physical elements, its climatic regime, and natural disturbances (36 CFR 219.19).

Integrated resource management. Multiple-use management that recognizes the interdependence of ecological resources and is based on the need for integrated consideration of ecological, social, and economic factors (36 CFR 219.19).

Integration recognizes and identifies key relationships between various plan resources and activities. Plan components are integrated to address a variety of ecological and human needs. For example, desired conditions for ponderosa pine incorporate habitat needs for a variety of species, as well as the scenic components that recreationist's desire. Interrelationships between parts of the plan are identified with crosswalks to show their systematic nature. In electronic versions of the plan, these crosswalks are hyperlinked (indicated by italicized text) to allow users to be easily redirected to the other relevant sections of the plan.

Intermittent stream. A stream or reach of stream channel that flows, in its natural condition, only during certain times of the year or in several years, and is characterized by interspersed, permanent surface water areas containing aquatic flora and fauna adapted to the relatively harsh environmental conditions found in these types of environments. Intermittent streams are identified as dashed blue lines on USGS 7 1/2-inch quadrangle maps.

Invasive species. An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. A species that causes, or is likely to cause, harm and that is exotic to the ecosystem it has infested. Invasive species infest both aquatic and terrestrial areas and can be identified within any of the following four taxonomic categories: Plants, Vertebrates, Invertebrates, and Pathogens (Executive Order 13112). Sometimes referred to as nonnative invasives or exotic species.

Land grant-merced. A grant of land made by the Government of Spain or of Mexico to a community, town, colony, pueblo, or person for the purpose of founding or establishing a community, town, colony, or pueblo.

Land grant-merced governing body. A community land grant-merced recognized under a State of New Mexico law, statute, or code, with a duly elected or appointed governance body charged with management, care and protection of land grant-merced common lands.

Landscape. A defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area (36 CFR 219.19).

Leave No Trace. Guidelines that help protect the land and lessen the sights and sounds of forest visitors. http://www.lnt.org/

Line officer. A Forest Service official who serves in a direct line of command from the Chief (36 CFR 219.62).

Litter. Dead, unattached organic material on the soil surface that is effective in protecting the soil surface from raindrop splash, sheet, and rill erosion and is at least ½ inch thick. Litter is composed of leaves, needles, cones, and woody vegetative debris including twigs, branches, and trunks.

Maintain. In reference to an ecological condition: To keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure, and processes. Depending upon the circumstance, ecological conditions may be maintained by active or passive management or both (36 CFR 219.19).

Management actions. Any alterations to ecosystems or activities that the Forest Service conducts or authorizes on NFS lands. These may include mechanical thinning, prescribed burning, permitted grazing, permitted fuelwood gathering, vehicular access, stream restoration treatments, seeding, trail construction, fencing, among others.

Management area. A land area identified within the planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous (36 CFR 219.19).

Mechanical treatment. For the purposes of this plan, mechanical treatments include most vegetation treatments except fire. They may include mechanized cutting, hand thinning, and other silvicultural treatments.

Memorandum of understanding (MOU). A bilateral or multilateral agreement between two or more parties. It expresses a convergence of will between the parties, indicating an intended common line of action. It is often used in cases where parties either do not imply a legal commitment or in situations where the parties cannot create a legally enforceable agreement. It is a more formal alternative to a handshake agreement.

Minimum requirements analysis. Required by law whenever land managers are considering a use prohibited by Section 4(c) of the Wilderness Act of 1964, and is a process that was developed by the Arthur Carhart National Wilderness Training Center to help land managers make informed, defensible decisions that comply with the Wilderness Act.

Mitigate. To avoid, minimize, rectify, reduce, or compensate the adverse environmental impacts associated with an action.

Monitoring. A systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships (36 CFR 219.19).

Mosaic. Mix of recurring patterns of forested and non-forested areas at the identified scale (e.g., landscape, watershed, mid-scale). Patterns are variable and may change over time.

Motor vehicle. Any vehicle that is self-propelled, other than:

1. A vehicle operated on rails; and
2. Any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212.1, 36 CFR 261.2).

Motor vehicle use map (MVUM). A map reflecting designated roads, trails, and areas on an administrative unit or a ranger district of the National Forest System (36 CFR 212.1).

Multiple use. The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531) (36 CFR 219.19).

National Environmental Policy Act (NEPA). A United States environmental law (42 U.S.C. 4321 et seq.) enacted January 1, 1970, that established a U.S. national policy promoting the enhancement of the environment. Additionally, it established the President's Council on Environmental Quality (CEQ).

National Forest System. Includes National Forests, National Grasslands, and the National Tallgrass Prairie (36 CFR 219.62).

National Forest System Road. A forest road other than a road that has been authorized by a legally documented right-of-way held by a State, county or other local public road authority (36 CFR 212.1, 36 CFR 251.51, 36 CFR 261.2).

National Trail. One among a network of national scenic, historic, and recreation trails designated by the National Trails System Act of 1968, as amended. These trails provide for outdoor recreation needs, promote the enjoyment, appreciation, and preservation of open-air, outdoor areas and historic resources, and encourage public access and citizen involvement.

National Forest System Trail. A forest trail other than a trail authorized by a legally documented right-of-way held by a State, county, or other local public road authority (36 CFR 212.1).

Native species. An organism that was historically or is present in a particular ecosystem as a result of natural migratory or evolutionary processes and not as a result of an accidental or deliberate introduction into that ecosystem. An organism’s presence and evolution (adaptation) in an area are determined by climate, soil, and other biotic and abiotic factors (36 CFR 219.19).

Natural variability. Is a reference to past conditions and processes that provide important context and guidance relevant to the environments and habitats in which native species evolved. Disturbance driven spatial and temporal variability is vital to ecological systems. Biologically appropriate disturbances provide for heterogeneous conditions and subsequent diversity. Conversely, “uncharacteristic disturbance,” such as high-intensity fire in plant communities that historically had a frequent low-intensity fire regime can have the effect of reducing diversity, increasing homogeneity, and may result in permanently altered conditions.

Objective. A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets.

Off-highway vehicle (OHV). Any motorized vehicle designed for or capable of cross-county travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain; except that term excludes (a) any registered motorboat, (b) any fire, military, emergency or law enforcement vehicle when used for emergency purposes, and any combat or combat support vehicle when used for national defense purposes, and (c) any vehicle whose use is expressly authorized by the respective

agency head under a permit, lease, license, or contract (EO 11644 as amended by EO 11989). See also FSM 2355. 01 - Exhibit 01.

Old-growth characteristics. Old-growth forests have accumulated specific characteristics related to tree size, canopy structure, snags and woody debris, and plant associations. Ecological characteristics of old-growth forests emerge through the processes of succession. Certain features—presence of large, old trees, multilayered canopies, forest gaps, snags, woody debris, and a particular set of species that occur primarily in old-growth forests—do not appear simultaneously, nor at a fixed time in stand development. Old-growth forests support assemblages of plants and animals, environmental conditions, and ecological processes that are not found in younger forests (younger than 150 to 250 years) or in small patches of large, old trees. Specific attributes of old-growth forests develop through forest succession until the collective properties of an older forest are evident.

Online. Refers to the appropriate Forest Service website or future electronic equivalent (36 CFR 219.62).

Openings. Generally persistent treeless areas having a fairly distinct shape or size, occurring naturally due to differences in soil types as compared to sites that support forests or woodlands. Openings include meadows, grasslands, rock outcroppings, and wetlands. In contrast, created openings result from disturbances like severe fire or windthrow, or management activities to intentionally create space for new tree regeneration. Natural and created openings are not the same as interspaces found in the frequent-fire forests or woodlands. See interspaces.

Outstanding natural resource water (ONRW). Streams, lakes, and wetlands that receive special protection against degradation under New Mexico's water quality standards and the Federal Clean Water Act. They are designated by the Water Quality Control Commission. Waters eligible for ONRW designation include waters that are part of a national or state park, wildlife refuge or wilderness areas, special trout waters, waters with exceptional recreational or ecological significance, and high-quality waters that have not been significantly modified by human activities (NMED 2015).

Participation. Activities that include a wide range of public involvement tools and processes, such as collaboration, public meetings, open houses, workshops, and comment periods (36 CFR 219.19).

Perennial stream. A stream or reach of a channel that flows continuously or nearly so throughout the year and whose upper surface is generally lower than the top of the zone of saturation in areas adjacent to the stream. These streams are identified as solid blue on the USGS 7 1/2-inch quadrangle maps.

Permit area. Area in which an activity is authorized through a special-use permit.

Persistence. Continued existence (36 CFR 219.19).

Plan or land management plan. A document or set of documents that provide management direction for an administrative unit of the National Forest System developed under the requirements of the land management planning regulation at 36 CFR part 219 or a prior planning rule (36 CFR 219.19).

Plan area. The NFS lands covered by a plan (36 CFR 219.19), specifically, lands managed by the Forest Service as the Santa Fe NF.

Plan components. The parts of a land management plan that guide future project and activity decision-making. Specific plan components may apply to the entire plan area, to specific management areas or geographic areas, or to other areas as identified in the plan. Every plan must include the following plan components: Desired conditions; Objectives; Standards; Guidelines; Suitability of Lands. A plan may also include Goals as an optional component.

Plan development. The second phase in the forest plan revision process. Plan development follows the NEPA process and plan revision requires preparation of an environmental impact statement. It is grounded in the information developed during the assessment phase and other information relevant to the plan area, it addresses needs for change, and involves the public. Every plan must have management areas or geographic areas or both and may identify designated or recommended designated areas (36 CFR 219.7).

Plan monitoring program. An essential part of the land management plan that sets out the plan monitoring questions and associated indicators, based on plan components. The plan monitoring program informs management of resources in the plan area and enables the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed.

Planned ignition (or planned fire). The intentional initiation of a wildland fire by hand-held, mechanical, or aerial device where the distance and timing between ignition lines or points and the sequence of igniting them is determined by environmental conditions (e.g., weather, fuel, or topography), firing technique, and other factors that influence fire behavior and fire effects. See prescribed fire.

Plant and animal community. A naturally occurring assemblage of plant and animal species living within a defined area or habitat (36 CFR 219.19).

Prescribed fire. A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements have been met prior to ignition. Also referred to as a planned ignition or planned fire.

Productivity. The capacity of NFS lands and their ecological systems to provide the various renewable resources in certain amounts in perpetuity. For the purposes of the land management planning regulation at 36 CFR part 219 and this land management plan, productivity is an ecological term, not an economic term (36 CFR 219.19).

Project. An organized effort to achieve an outcome on NFS lands identified by location, tasks, outputs, effects, times, and responsibilities for execution (36 CFR 219.19).

Proper functioning condition (PFC). Methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area. In either case, PFC defines a minimum or starting point.

Proposed species. Any species of fish, wildlife, or plant that is proposed by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service in the Federal Register to be listed under Section 4 of the Endangered Species Act. (36 CFR 219.19)

Rangelands. Forage-producing forested and non-forested lands.

Recovery. For the purposes of the land management planning regulation at 36 CFR part 219 and with respect to threatened or endangered species: The improvement in the status of a listed species to the point at which listing as federally endangered or threatened is no longer appropriate (36 CFR 219.19).

Recreation opportunity. An opportunity to participate in a specific recreation activity in a particular recreation setting to enjoy desired recreation experiences and other benefits that accrue. Recreation opportunities include non-motorized, motorized, developed, and dispersed recreation on land, water, and in the air (36 CFR 219.19).

Recreation opportunity spectrum (ROS). A system by which existing and desired recreation settings are defined, classified, inventoried, and monitored. Recreation settings are divided into six distinct classes (primitive, semiprimitive-nonmotorized, semiprimitive motorized, roaded natural, rural, and urban) defined below:

Primitive areas are characterized by essentially unmodified natural environments of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use and mechanized equipment within primitive areas is not permitted. Primitive areas in the Santa Fe NF are found within the Pecos, San Pedro Parks, Dome, and Chama River Canyon wilderness areas.

Semiprimitive Nonmotorized (SPNM) areas are characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but are subtle. An example of an SPNM area would be White Rock Canyon just west of the Caja del Rio Plateau near the City of Santa Fe.

Semiprimitive Motorized (SPM) areas are characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but are subtle. Most of Rowe Mesa and the Anton Chico area are examples of this classification.

Roaded Natural (RN) areas are characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of people. Such evidence usually harmonizes with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities. Examples of roaded natural areas include parts of the Caja del Rio Plateau and mesas in the Jemez and Cuba areas.

Rural (R) areas are characterized by a substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of people are readily evident, and the interaction between users is often moderate to high. Many facilities are designed for use by large numbers of people. Facilities are often provided for special activities, such as amphitheaters, group pavilions, group fire rings and cooking units, and so forth. Facilities for

intensified motorized use and parking are available. Some facilities may be designed primarily for user comfort and convenience. Some synthetic but harmonious materials may be incorporated. Design may be more complex and refined. Examples of rural areas in the Santa Fe NF are along NM Highway 475 to the Santa Fe Ski Basin, NM Highway 4 through the Jemez Mountains, and NM Highway 63 through the Pecos River Canyon.

Urban (U) areas are characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of people on-site are predominant. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site. Urban areas in the Santa Fe NF are primarily restricted to administrative facilities, but also include Ski Santa Fe facilities.

Classifications are based on physical, social, and managerial setting characteristics. The ROS framework integrates individual recreation setting characteristics (including access and scenic character) to function collectively in providing distinct recreation opportunities.

Recreation setting. The social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities. The Forest Service uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban (36 CFR 219.19).

Redundancy. The presence of multiple occurrences of ecological conditions such that not all occurrences may be eliminated by a catastrophic event.

Reference conditions. Environmental conditions that infer ecological sustainability. When available, reference conditions are represented by the characteristic natural range of variation (not the total range of variation), prior to European settlement and under the current climatic period. For many ecosystems, the natural range of variation also reflects human-caused disturbance and effects prior to settlement. It may also be necessary to refine reference conditions according to contemporary factors (e.g., invasive species) or projected conditions (e.g., climate change). Reference conditions are most useful as an inference of sustainability when they have been quantified by amount, condition, spatial distribution, and temporal variation.

Refugia. Habitats that convey spatial and temporal resistance and/or resilience to biotic communities affected by disturbances or as places or times where the negative effects of disturbance are lower than those in the surrounding area (or time; Sedell et al. 1990)

Regulated timber harvest. Tree harvest for the purposes of timber production, as opposed to tree harvest for other purposes, such as habitat and watershed improvement or fuelwood.

Representativeness. The presence of a full array of ecosystem types and successional states based on the physical environment and characteristic disturbance processes.

Resilience. The ability of an ecosystem and its component parts to absorb or recover from the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape (FSM 2020.5).

Responsible official. The official with the authority and responsibility to oversee the planning process and to approve a plan, plan amendment, and plan revision (36 CFR 219.62).

Restoration, ecological. The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions (36 CFR 219.19).

Restore. To renew by the process of restoration. See restoration (36 CFR 219.19).

Riparian areas. Three-dimensional ecotones (the transition zone between two adjoining communities) of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths (36 CFR 219.19).

Riparian management zone. The interface between land and a river or stream. Plant habitats and communities along the river margins and banks are called riparian vegetation, characterized by hydrophilic plants. Riparian management zones (RMZ) should be defined to include either a site-appropriate delineation of the riparian area or a buffer of 100 feet from the edges (e.g., each stream bank at bankfull or edge of the waterbody) of all perennial and intermittent streams, lakes, seeps, springs, and other wetlands or 15 feet from the edges of the ephemeral channels. The waterbody itself is considered part of the RMZ. The exact width of RMZs may vary based on ecological or geomorphic factors or by waterbody type but includes those areas that provide riparian and aquatic ecosystem functions and connectivity.

Risk. A combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative consequences (36 CFR 219.19).

Road. A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212.1).

Road Maintenance Levels (ML):

ML1. Roads that are closed to vehicular traffic intermittently for periods that exceed 1 year. Can be operated at any other maintenance level during periods of use.

ML2. Roads that are open and maintained for use by high-clearance vehicles; surface smoothness is not a consideration. Most have native material surface (not paved and no aggregate surface).

ML3. Roads that are open and maintained for use by standard passenger cars. Most have gravel surface.

ML4. Roads that are open and maintained for use by standard passenger cars and to provide a moderate degree of user comfort and convenience at moderate travel speeds. Most are paved or have an aggregate surface.

ML5. Roads that are open and maintained for use by standard passenger cars

Routine maintenance. Work that is planned to be accomplished on a continuing basis, generally annually or more frequently (FSH 7709.58, 13.41).

Scenery Management System. A classification system that recognizes scenery as the visible expression of dynamic ecosystems functioning within "places," which have unique aesthetic and social values. It recognizes that in addition to naturally occurring features, positive scenery attributes associated with social, cultural, historical, and spiritual values, including human presence and the built environment, can also be valued elements of the scenery. The Scenery Management System also allows for "seamless" analysis and conservation beyond NFS lands into adjacent communities and other jurisdictions, through the application of varying scenery "themes" within a single analysis. It is structured to emphasize "natural-appearing" scenery.

There are four distance zones, ranging from 0-300 feet (immediate foreground), 0-0.5 mile (foreground), 0.5-4 miles (middleground), and 4 miles to the horizon (backround). The seen area in any distance zone may be limited by topographic features (i.e., cliffs) and will impact landscape visibility, scenic classes, and scenic integrity objectives.

Scenic character. A combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity (36 CFR 219.19).

Scenic integrity objective. A desired level of excellence based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations to the valued attributes of the characteristic landscape. Objectives include very high, high, moderate, and low.

Seral stage (seral state). One of a series of transitional plant communities that develop during gradual successive change following disturbance.

Snags. Standing dead or partially dead trees (snag topped), often missing many or all limbs. They provide essential wildlife habitat for many species and are important for forest ecosystem function.

Soil and Water Conservation Districts. Independent subdivisions of the New Mexico state government that are authorized by the Soil and Water Conservation District Act (73-20-25 through 73-20-48 NMSA 1978) to perform functions such as conserving and developing natural resource, flood control, and wildlife preservation.

Soil condition rating. A qualitative rating developed within the Southwestern Region of the Forest Service that provides an overall picture of soil condition vital in sustaining ecosystems. It is based on three soil functions: the ability of soil to resist erosion, infiltrate water, and recycle nutrients. There are four soil condition ratings:

- *Satisfactory*. Soil function is being sustained and soil is functioning properly and normally.
- *Impaired*. The ability of the soil to function properly and normally has been reduced or there exists an increased vulnerability to degradation.
- *Unsatisfactory*. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs or recover from impacts.
- *Inherently unstable*. These soils are eroding faster than they are renewing themselves.

Species of conservation concern. A species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long term in the plan area (36 CFR 219.9(c)).

Stand. A contiguous group of trees generally uniform in age class distribution, composition, condition, and structure, and growing on a site of generally uniform quality, to be a distinguishable unit, such as mixed, pure, even-aged, and uneven-aged stands. A stand is the fundamental unit of silviculture reporting and record keeping.

Standard. A mandatory constraint on project and activity decision-making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

Stressors. For the purposes of the land management planning regulation at 36 CFR part 219, factors that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological process in a manner that may impair its ecological integrity, such as an invasive species, loss of connectivity, or the disruption of a natural disturbance regime (36 CFR 219.19).

Sustainable operations is the commitment by the Forest Service to use energy efficiently and reduce consumption of resources in daily operations. By doing work differently in six Footprint Focus Areas, the Santa Fe NF is reducing its environmental impact.

1. Energy - Improve energy efficiency and reduce greenhouse gas emissions, through the reduction of energy. Shift toward renewable energy, such as solar power and biomass.
2. Water - Reduce water consumption in Forest Service buildings, grounds, and related facilities.
3. Green Purchasing - Increase the sustainability performance of purchased goods and services, and the performance of suppliers, contractors, and partners. Increase the number of Forest Service buildings that are Leadership in Energy and Environmental Design (LEED) certified.
4. Fleet and Transportation - Improve our transportation and travel practices, which in turn will reduce harmful emissions, increase operational and fuel efficiency, and reduce the use of non-renewable fuel.
5. Waste Prevention and Recycling - Minimize waste generation and reduce landfill use. Reduce, reuse and recycle materials.
6. Sustainability Leadership - Make strong efforts to meet or exceed the requirements of Executive Orders and policies related to sustainable operations. Leadership and management have a commitment to communicate the agency’s vision for sustainable operations.

Sustainability. The capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For the purposes of the land management planning regulation at 36 CFR part 219 and this land management plan ‘‘ecological sustainability’’ refers to the capability of ecosystems to maintain ecological integrity; ‘‘economic sustainability’’ refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and ‘‘social sustainability’’ refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities (36 CFR 219.19).

Sustainable recreation. The set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations (36 CFR 219.19).

Sustainable Yield Limit (SYL). The sustained yield limit is an estimate of the amount of commercial wood products that may be sustainably harvested over a long period of time.

Sub-watershed. An HUC 12 hydrologic unit, the smallest subdivision considered in this assessment.

Terrestrial ecosystem. All interacting organisms and elements of the abiotic environment in those vegetation and soil types, which are neither aquatic nor riparian.

Terrestrial ecosystem survey (TES). An inventory of soil types or terrestrial ecosystem units (TEUs) in the Santa Fe NF. It contains predictions and limitations of soil and vegetation behavior for selected land uses. This survey also highlights hazards or capabilities inherent in the soil and the impact of selected uses on the environment. At the context scale, upland ecological response units are derived from the Santa Fe NF Terrestrial Ecosystem Survey (USDA FS Santa Fe 1987).

Terrestrial ecosystem unit (TEU). The classification unit used in the Terrestrial Ecosystem Survey (TES). A spatially explicit area with a similar combination of soils, land types, and vegetation.

Threatened species. Any species that the Secretary of the Interior or the Secretary of Commerce has determined is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are listed at 50 CFR sections 17.11, 17.12, and 223.102.

Timber harvest. The removal of trees for wood fiber use and other multiple-use purposes (36 CFR 219.19).

Timber production. The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use (36 CFR 219.19).

Traditional community. A land-based rural community that has a long-standing history in and around the lands managed by the Forest Service.

Traditional cultural property. A property that is eligible for inclusion in the National Register of Historic Places based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.

Traditional knowledge. A way of knowing or understanding the world, including traditional ecological and social knowledge of the environment derived from multiple generations of indigenous peoples' interactions, observations, and experiences with their ecological systems. Traditional knowledge is place-based and culture-based knowledge in which people learn to live in and adapt to their own environment through interactions, observations, and experiences with their ecological system. This knowledge is generally not solely gained, developed by, or retained by individuals, but is rather accumulated over successive generations and is expressed through oral traditions, ceremonies, stories, dances, songs, art, and other means within a cultural context. It is traditional in the sense that it has been accumulated through traditions but remains relevant today. Traditional knowledge is synonymous with native knowledge (36 CFR 219.19).

Tribal Consultation. The timely, meaningful, and substantive dialogue between Forest Service officials who have delegated authority to consult, and the official leadership of federally recognized tribes, or their designated representatives, pertaining to USDA Forest Service policies that may have tribal implications.

Tree size. The diameter of the bole of a tree measured at breast height (dbh).

- Seedling/Sapling: 0.0 to 4.9 inches diameter
- Small tree: 5.0 to 9.9 inches diameter
- Medium tree: 10 to 19.9 inches diameter
- Large tree: 20.0 inches or larger diameter

User conflict. User conflict arises when people who are using the forest are interrupted in their activities by the activities of other forest users.

Uncharacteristic wildfire. An increase in wildfire size, severity, and resistance to control compared to reference conditions that occurred historically. These fires result as a consequence of more continuous canopy cover, ladder fuels, and accumulated live and dead woody material. Uncharacteristic wildfires burn with more intensity; cause higher tree mortality; degrade watersheds; sterilize soils; and threaten adjacent communities, forest infrastructure, and wildlife habitat. See reference conditions.

Ungulate. A hooved animal, which includes wildlife (e.g., pronghorn, deer, and elk) and domestic livestock (e.g., sheep, cattle, and horses).

Unplanned ignition. The initiation of a wildland fire by lightning or unauthorized and accidental human-caused fires. See wildfire.

Upland. May refer to areas, species, systems, or conditions that are characteristic of terrestrial ecosystems, as opposed to riparian or aquatic ecosystems.

Vegetation community is a group of sites that have similar plant species composition, successional patterns, and disturbance regimes, such that similar sites will respond in similar ways to disturbance, biological, and physical processes. In some areas there is a difference between the existing vegetation on a site and the vegetation community it belongs to, such as where historic grasslands are currently invaded by trees. The desired vegetation community, not the existing vegetation, determines which desired conditions apply. Most vegetation communities correspond to a mapped ecological response unit (ERU), though it is appropriate to base management for a particular vegetation community on local conditions, including soils and other site-specific indicators.

Vegetation structure. Both vertical and horizontal arrangement of vegetation. Horizontal structure may refer to tree size, tree density, and to patterns of trees or groups of trees and their adjoining openings. Vertical structure may refer to the layers, appearance, and composition of vegetation between the ground and the top of the vegetation canopy and includes any grasses, forbs, shrubs, and trees.

Watershed. A region or land area drained by a single stream, river, or drainage network; a drainage basin (36 CFR 219.19). Specifically, an HUC 10 hydrologic unit, larger than a sub-watershed, and nested in a sub-basin.

Watershed condition. The state of a watershed based on physical and biogeochemical characteristics and processes (36 CFR 219.19).

Wetlands. A specific subtype within the wetland riparian group of vegetation communities. In wetlands, saturation with water is the dominant factor determining the nature of soil development and plant and animal communities. "For regulatory purposes under the Clean Water Act, the term wetlands means 'those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.' [taken from the EPA Regulations listed at 40 CFR 230.3(t)]." (USEPA 2015) The wetland riparian vegetation community as defined in this plan is slightly more inclusive and includes open water wetlands and cienegas that may not be considered wetlands for regulatory purposes.

Wild and scenic river. A river designated by Congress as part of the National Wild and Scenic Rivers System that was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 (note), 1271–1287) (36 CFR 219.19).

Wilderness. Any area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964 (16 U.S.C. 1131–1136) (36 CFR 219.19).

Wildfire. Unplanned ignition of a wildland fire (e.g., fires caused by lightning or unauthorized and accidental human-caused fires) and escaped prescribed fires. See unplanned ignition.

Wildfire hazard. A fuel complex, defined by volume, type condition, arrangement, and location, that determines the degree or ease of ignition and of resistance to control.

Wildland. An area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

Wildland-urban interface (WUI). The areas in which homes and wildlands meet or intermingle (Stein et al. 2013). From a natural resource perspective, the wildland-urban interface is an area where increased human influence and land-use conversion are changing natural resource goods, services, and management techniques (Hermansen-Baez et al. 2009).

Woodland. Lands with over 10 percent tree canopy cover where the majority of the trees are non-timber species (e.g., piñon pine and juniper) not traditionally used for industrial wood products.

References

Adler, P., D. Raff, and W. Lauenroth. 2001. The effect of grazing on the spatial heterogeneity of vegetation. *Oecologia*, 128(4), pp.465-479.

Allen, G.D. 1989. Changes in the landscape of the Jemez Mountains, New Mexico. University of California Berkeley.

Baison, C.H., and T.W. Swetnam. 1990. Fire history on a desert mountain range: Rincon Mountain Wilderness, Arizona, USA. *Can. J. Forest Res*. 20: 1559–1569.

Baison, C.H., and T.W. Swetnam. 1995. Historical fire occurrence in remote mountains of southwestern New Mexico and northern Mexico. In: J.K. Brown, R.W. Mutch, C.W. Spoon, and R.H. Wakimoto (eds.), Proceedings of the Symposium on Fire in Wilderness and Park Management. USDA Forest Service Gen. Tech. Rep. INT-GTR-320. Intermountain Research Station, Ogden, UT. pp. 153–156.

Birds of the Sandia and Manzano mountains including the manzanitas and the Gallinas Mountains. 2006. Sandia and Mountainair Ranger Districts, Cibola National Forest.

Bradford, D., F. Reed, R.B. LeValley, C. Campbell, and S. Kossler. 2002. Livestock grazing on the national forests--why continue to do it? *Rangelands Archives*, 24(2), pp.3-11.

Brown, J.H. and W. McDonald. 1995. Livestock grazing and conservation on southwestern rangelands. *Conservation Biology*, *9*(6), pp.1644-1647.

Budd, B. and J. Thorpe. 2009. Benefits of Managed Grazing: A Manager's Perspective. *Rangelands*, 31(5), 11-14.

Carey, H. and M. Schumann. 2003. Modifying wildfire Behavior – The Effectiveness of Fuel Treatments: The Status of our Knowledge. National Community Forestry Center, Southwest Region. Working Paper April 2003.

Covington, W.W., P.Z. Fulé, M.M. Moore, S.C. Hart, T.E. Kolb, J.N. Mast, S.S. Sackett and M.R. Wagner. 1997. Restoring ecosystem health in ponderosa pine forests of the Southwest. *Journal of Forestry* 95(4): 23- 29.

Derner, J.D., W.K. Lauenroth, P. Stapp, and D.J. Augustine. 2009. Livestock as ecosystem engineers for grassland bird habitat in the western Great Plains of North America. *Rangeland Ecology and Management*, 62, 111–118.

Dick-Peddie, W. 1993. *New Mexico vegetation: past, present, and future*. Univ. New Mexico Press, Albuquerque.

DOT and F.H.A. 1995. National Scenic Byways Program. Federal Register, Vol. 60, No. 96.

Floyd, M.L., D.D. Hanna, and W.H. Romme. 2004. Historical and recent fire regimes in piñon-juniper woodlands on Mesa Verde, USA. *Forest Ecology and Management* 198:269–289.

Floyd, M.L., W.H. Romme, and D.D. Hanna. 2000. Fire history and vegetation pattern in Mesa Verde National Park, Colorado, USA. *Ecological Applications* 10:1666–1680.

Gottfried, G.J., T.W. Swetnam, G.D. Allen, J.L. Betancourt, and A.L. Chung-MacCoubrey. 1995. Pinyon-juniper Woodlands. Chapter 6. Finch, D.M., J.A. Tainter, Tech. Eds. Ecology, diversity, and sustainability of the Middle Rio Grande Basin. General Technical Report PM-

GTR-268. Fort Collins, CO: USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station. 186 pp.

Grissino-Mayer, H.D., C.H. Baisan, and T.W. Swetnam. 1995. Fire history in the Pinaleño Mountains of southeastern Arizona: effects of human-related disturbances. L. Debano et al. tech. coords., Biodiversity and Management of the Madrean Archipelago: The Sky Islands of Southwestern United States and Northwestern New Mexico, September 19-23, 1994, Tucson, Arizona, USDA Forest Service General Technical Report RM-GTR-264, 399-407.

Gruell, G.E., L.E. Eddleman, and R. Jaindl. 1994. Fire history of the pinyon-juniper woodlands of Great Basin National Park. USDI National Park Service Technical Report NPSIPNROSUINRTR-94/01. Seattle WA. 27 pp.

Hauser, A. Scott. 2007. *Juniperus pinchotii*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available: http://www.fs.fed.us/database/feis/ accessed 11 May 2018.

Havstad, K.M., D.P. Peters, R. Skaggs, J. Brown, B. Bestelmeyer, E. Fredrickson, J. Herrick, and J. Wright. 2007. Ecological services to and from rangelands of the United States. *Ecological Economics*, 64(2), pp.261-268.

Heinlein, T.A., M.M. Moore, P.Z. Fulé, and W.W. Covington. 2005. Fire history and stand structure of two ponderosa pine-mixed conifer sites: San Francisco Peaks, Arizona, USA. *International Journal of Wildland Fire* 14:307-320.

Hermansen-Baez, A., J. Seitz, and M.C. Monroe. 2009. Wildland Urban Interface: Varied Definitions. Adapted from, "Wildland-Urban Interface Issues and Connections" by L. A. Hermansen-Báez. In: Changing roles: wildland-urban interface professional development program. Monroe, M.C., L.W. McDonell, and L.A. Hermansen-Báez, eds. 2006. Gainesville, Florida: University of Florida.

Hurteau, M.D. 2017. Quantifying the carbon balance of forest restoration and wildfire under projected climate in the fire-prone Southwestern US. PLoS ONE, 12:e0169275.

Jennings, S.B., N.D. Brown, and D. Sheil. 1999. Assessing forest canopies and understory illumination: canopy closure, canopy cover and other measures. *Forestry* 72(1): 59–74.

Krofcheck, D.J., C.C. Remy, A.R. Keyser, and M.D. Hurteau. 2019. Optimizing forest management stabilizes carbon under projected climate and wildfire. *Journal of Geophysical Research – Biogeosciences*, doi: 10.1029/2019JG005206

LANDFIRE. 2010. Existing Vegetation Type, U.S. Department of Agriculture and U.S. Department of the Interior.

Maher, A.T., N.E. Quintana Ashwell, K.A. Maczko, D.T. Taylor, J.A. Tanaka, and M.C. Reeves. 2021. An economic valuation of federal and private grazing land ecosystem services supported by beef cattle ranching in the United States. *Translational Animal Science*, 5(3), p.txab054

Margolis, E.Q. 2014. Fire regime shift linked to increased forest density in a piñon–juniper savanna landscape. *International Journal of Wildland Fire* 23:234-245.

McSweeney, A.M. and C. Raish. 2012. Social, cultural, and economic aspects of livestock ranching on the Santa Fe and Carson National Forests. Gen. Tech. Rep. RMRS-GTR-276. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 199 pp.

Miller, G., J. Redders, R. Stein, M. Edwards, J. Phillips, V. Andrews, and E. Benally Jr. 1993. Terrestrial ecosystems survey of the Santa Fe National Forest. USDA Forest Service, Southwestern Region.

Miller, R.F., and R.J. Tausch. 2000. The role of fire in pinyon and juniper woodlands: a descriptive analysis. Pages 15–30 in Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species. Fire conference.

Mohlenbrock, R. H. 1988. Canada Bonito, New Mexico. *Natural History* 97(11): 26-31.

Muldavin, E, C. Baisan, T. Swetnam, L. DeLay, and K. Morino. 2003. Woodland Fire History Studies in the Oscura and Northern San Andres Mountains, White Sands Missile Range, New Mexico. Final report. WNR-ES-ES Research Study No. 92F018. White Sands Missile Range, New Mexico.

New Mexico Environment Department/Surface Water Quality Bureau (NMED). 2016. *State of New Mexico Surface* Clean Water Act Section 303(d)/Section 305(b) Integrated Report. Santa Fe, NM. Available at: https://www.env.nm.gov/swqb/303d-305b/2016-2018/documents/EPA-APPROVED2016-2018IR092316.pdf

New Mexico Highway and Transportation Department, F.H.A. (1998). *El Camino Real National Scenic Byway*. 3.

O'Connor, C.D., D.A. Falk, A.M. Lynch, and T.W. Swetnam. 2014. Fire severity, size, and climate associations diverge from historical precedent along an ecological gradient in the Pinaleño Mountains, Arizona, USA. *Forest Ecology and Management* 329:264–278.

Poulos, H.M., R.G. Gatewood, and A.E. Camp. 2009. Fire regimes of the pinon-juniper woodlands of Big Bend National Park and the Davis Mountains, west Texas, USA. *Can. J. For. Res.* 39: 1236–1246.

Raish, C. and A.M. McSweeney. 2003. Economic, social, and cultural aspects of livestock ranching on the Española and Canjilon Ranger Districts of the Santa Fe and Carson National Forests: a pilot study. Gen. Tech. Rep. RMRS-GTR-113. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 89 pp.

Romme, W.H., M.L. Floyd, D. Hanna, and E.J. Bartlett. 2009. Historical Range of Variability and Current Landscape Condition Analysis: South Central Highlands Section, Southwestern Colorado and Northwestern New Mexico. Colorado Forest Restoration Institute.

Sedell, J.R., G.H. Reeves, F.R. Hauer, and J.A. Stanford. 1990. Role of refugia in recovery from disturbances: Modern fragmented and disconnected river systems. *Environmental Management*, 14(5), 711-724. DOI 10.1007/BF02394720.

Stahlecker, D.W., P.L. Kennedy, A.C. Cully, and C.B. Kuykendall. 1989. Breeding Bird Assemblages in the Rio Grande Wild and Scenic River Recreation Area, New Mexico. *The Southwestern Naturalist*. 34(4):487-498.

Stein, S.M., J. Menakis, M.A. Carr, S.J. Comas, S.I. Stewart, H. Cleveland, L. Bramwell, and V.C. Radeloff. 2013. Wildfire, wildlands, and people: understanding and preparing for wildfire in the wildland-urban interface—a Forests on the Edge report. Gen. Tech. Rep. RMRS-GTR-299. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 36 pp.

Strand, E.K., K.L. Launchbaugh, R.F. Limb, and L.A. Torell. 2014. Livestock Grazing Effects on Fuel Loads for Wildland Fire in Sagebrush Dominated Ecosystems. *Journal of Rangeland Applications*, 1, 35-57. Retrieved from https://thejra.nkn.uidaho.edu/index.php/jra/article/view/23

Swetnam, T.W., and J.H. Dieterich. 1985. Fire history of ponderosa pine forests in the Gila Wilderness, New Mexico.in Proceedings—symposium and workshop on wilderness fire. Gen. Tech. Rep. INT-GTR-182, Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.

Teague, R. and U. Kreuter. 2020. Managing grazing to restore soil health, ecosystem function, and ecosystem services. *Frontiers in Sustainable Food Systems*, p.157.

Tidwell, C. and H. Rosoff. 2009. Historic Route 66 National Scenic Byway Corridor Management Plan: 217.

USDA Forest Service. 1991. Agricultural Handbook 688: Forest and Rangeland Birds of the United States, Natural History and Habitat Use. 625 pp.

USDA Forest Service. 2000. Forest Service Roadless Area Conservation: Final Environmental Impact Statement. I: 656.

USDA Forest Service. 2007. Forest Service open space conservation strategy: Cooperating across boundaries to sustain working and natural landscapes. USDA For. Serv., FS-889, Washington, DC. 16 p.

USDA Forest Service. 2009. The 2009 Continental Divide National Scenic Trail Comprehensive Plan. Washington, DC: USDA Forest Service Retrieved from http://www.fs.fed.us/cdt/main/cdnst_comprehensive_plan_final_092809.pdf.

U.S. Department of the Interior (USDI). 2015. Riparian area management: Proper functioning condition assessment for lotic areas. Technical Reference 1737-15. Bureau of Land Management, National Operations Center, Denver, Colorado.

U.S. Department of the Interior (USDI). 2020. Riparian area management: Proper functioning condition assessment for lentic areas. 3rd ed. Technical Reference 1737-16. Bureau of Land Management, National Operations Center, Denver, Colorado.

Wahlberg, M.M., F.J. Triepke, W.A. Robbie, S.H. Strenger, D. Vandendriesche, E.H. Muldavin, and J.R. Malusa. 2013. Ecological Response Units of the Southwestern United States. USDA Forest Service Forestry Report FR-R3-XX-XX. Southwestern Region, Regional Office, Albuquerque, NM. 201 pp.

White, M.R. 2002. Characterization of, and changes in the subalpine and montane grasslands, Apache-Sitgreaves National Forests, Arizona.

Wright, H.A., and A.W. Bailey. 1982. *Fire ecology: United States and southern Canada*. John Wiley & Sons.

Yahdjian, L., O.E. Sala, and K.M. Havstad. 2015. Rangeland ecosystem services: shifting focus from supply to reconciling supply and demand. *Frontiers in Ecology and the Environment*, 13(1), pp. 44-51.

Appendix A. Maps

This appendix includes maps showing scenic integrity objectives (SIO), desired recreation opportunity spectrum (ROS), and the Continental Divide National Scenic Trail (CDNST) Corridor. These maps can be used as references for general locations of SIO and desired ROS categories referenced in plan components throughout chapters 2 and 3. The CDNST corridor map can be used as reference for plan components from the Continental Divide National Scenic Trail section, in chapter 3. When used in project planning, more detail can be obtained using GIS.

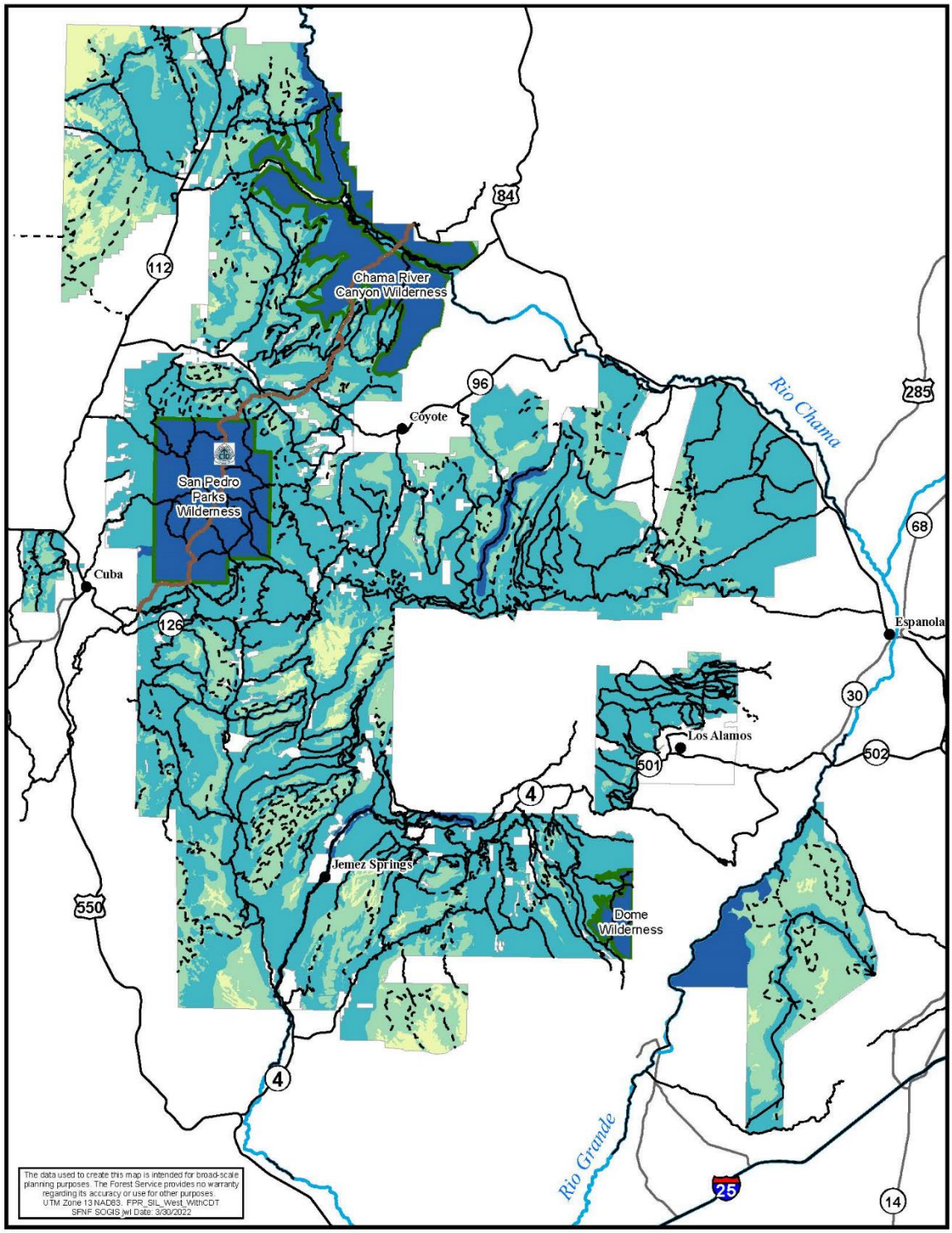


Figure 8-west. Scenic integrity objectives for the western half of the Santa Fe NF, from Cuba to Española. For legend see figure 8-east.

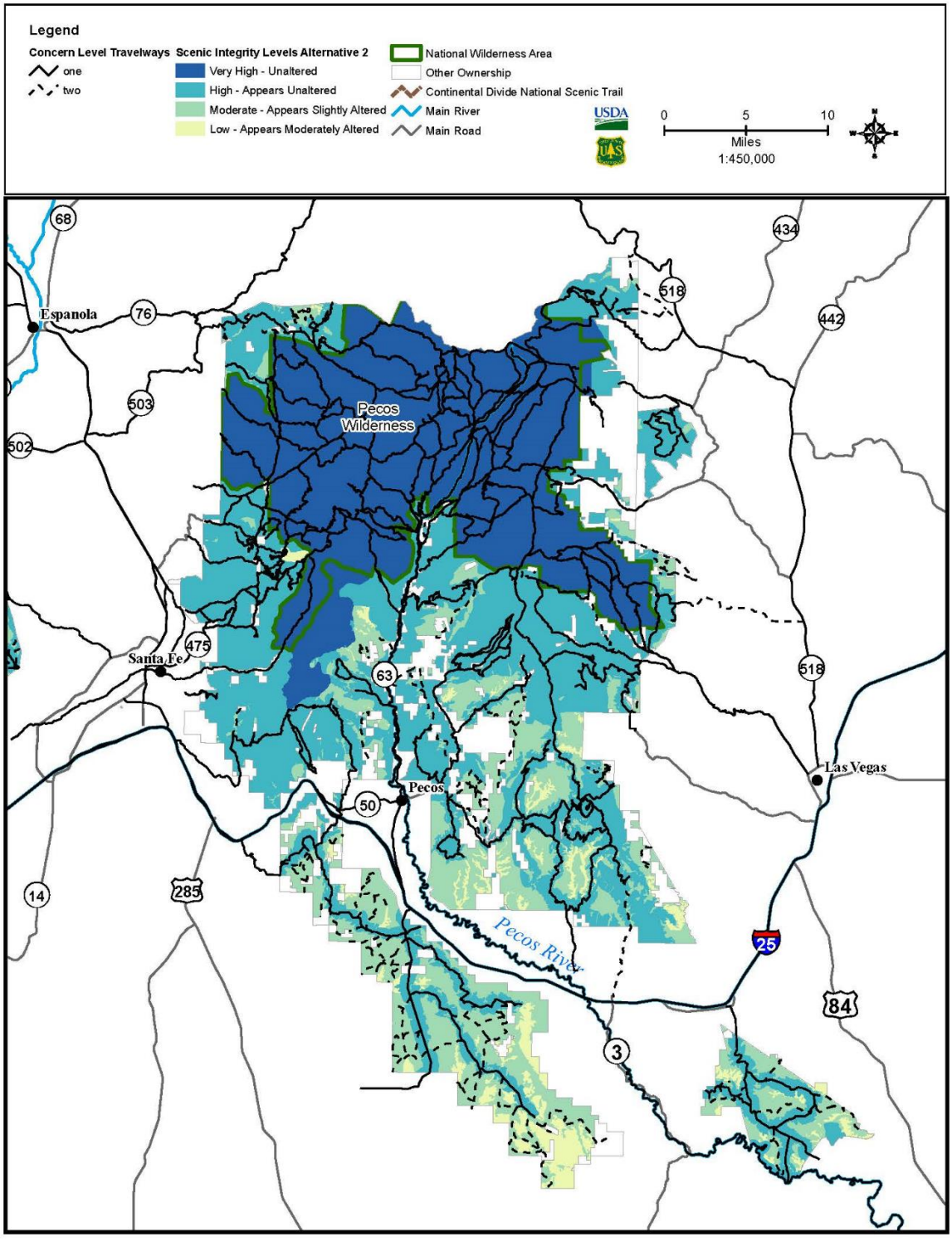


Figure 8-east. Scenic integrity objectives for the eastern half of the Santa Fe NF, from Española to Las Vegas

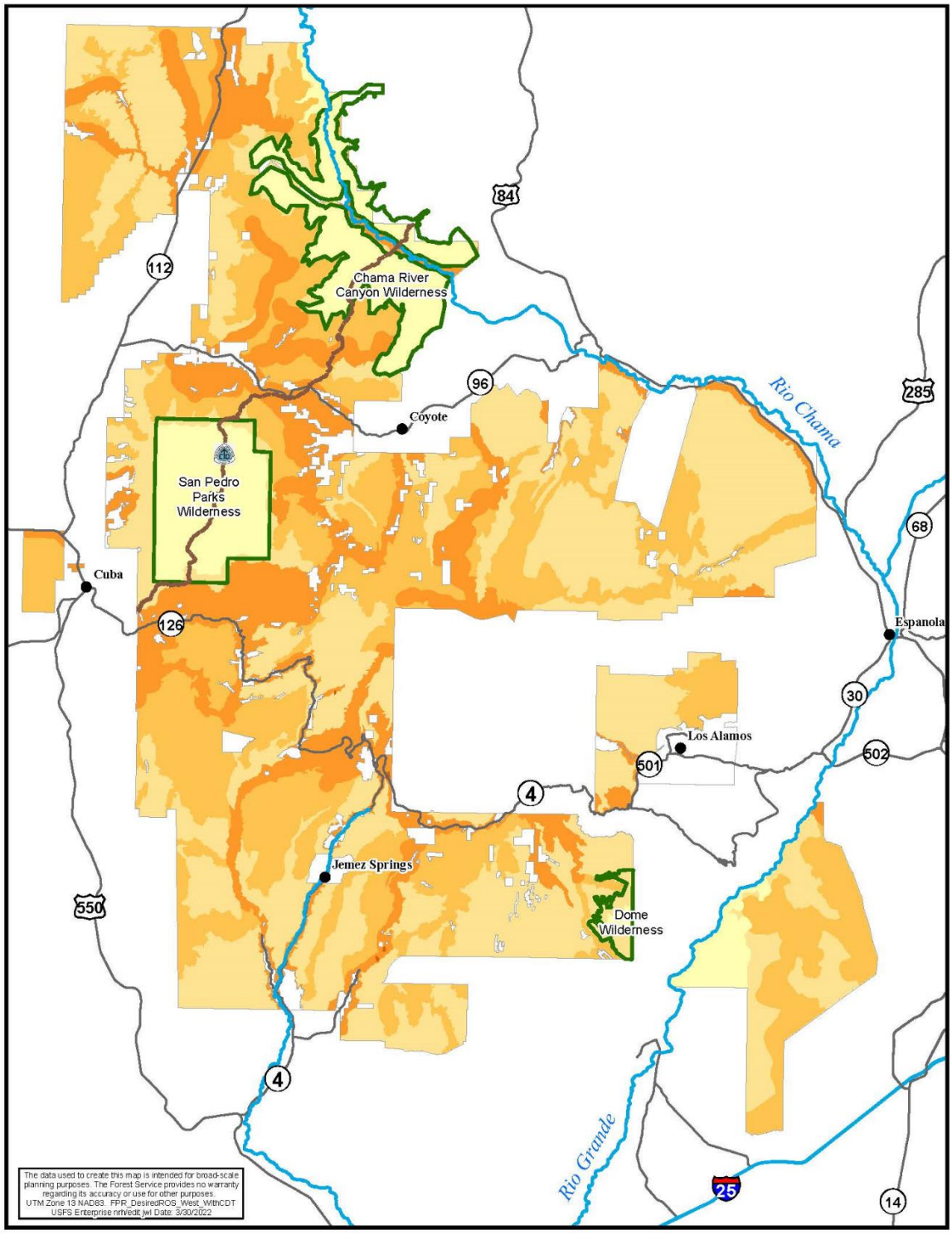


Figure 9-west. Desired recreation opportunity spectrum for the western half of the Santa Fe NF, from Cuba to Española. For legend see figure 9-east.

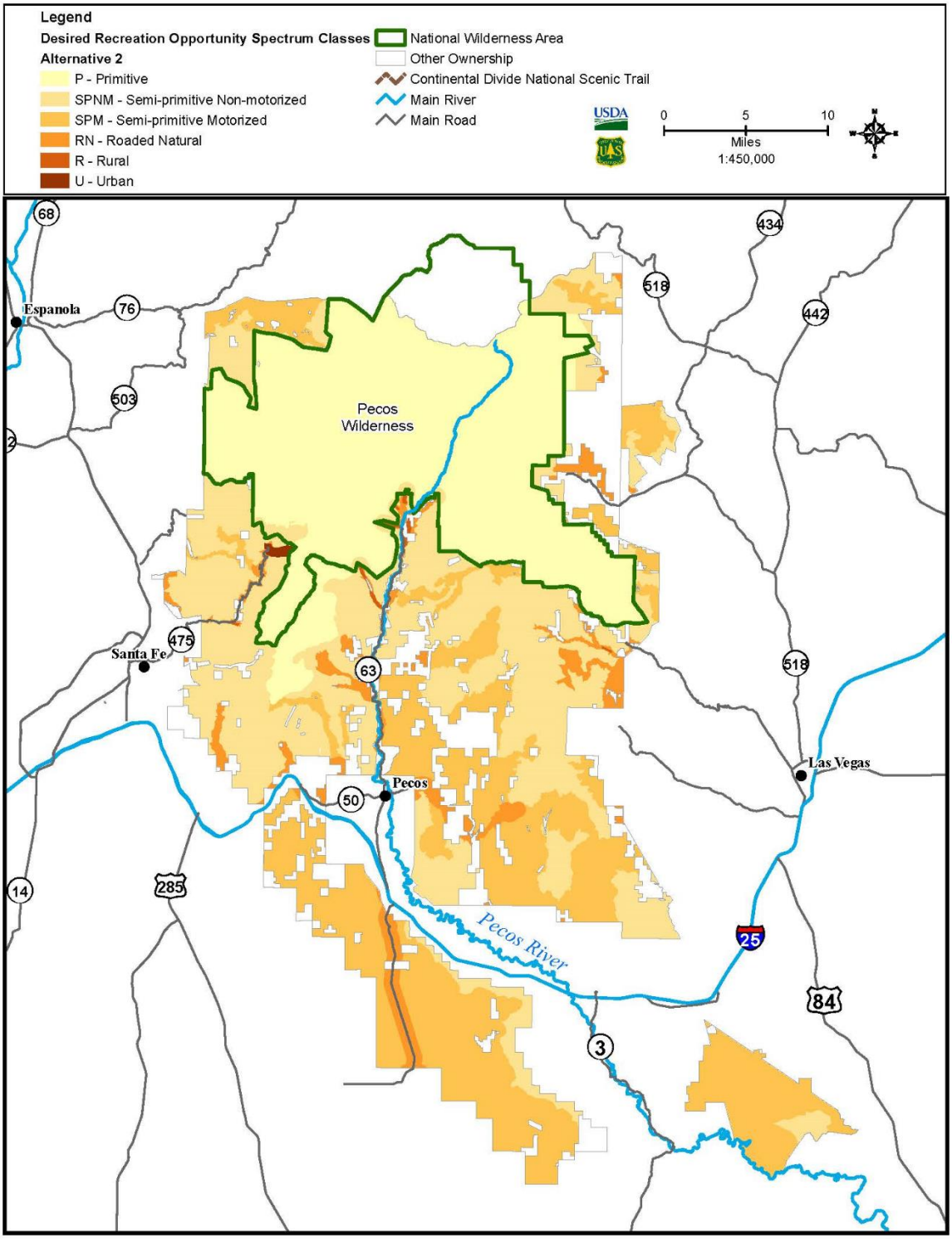


Figure 9-east. Desired recreation opportunity spectrum for the eastern half of the Santa Fe NF, from Española to Las Vegas

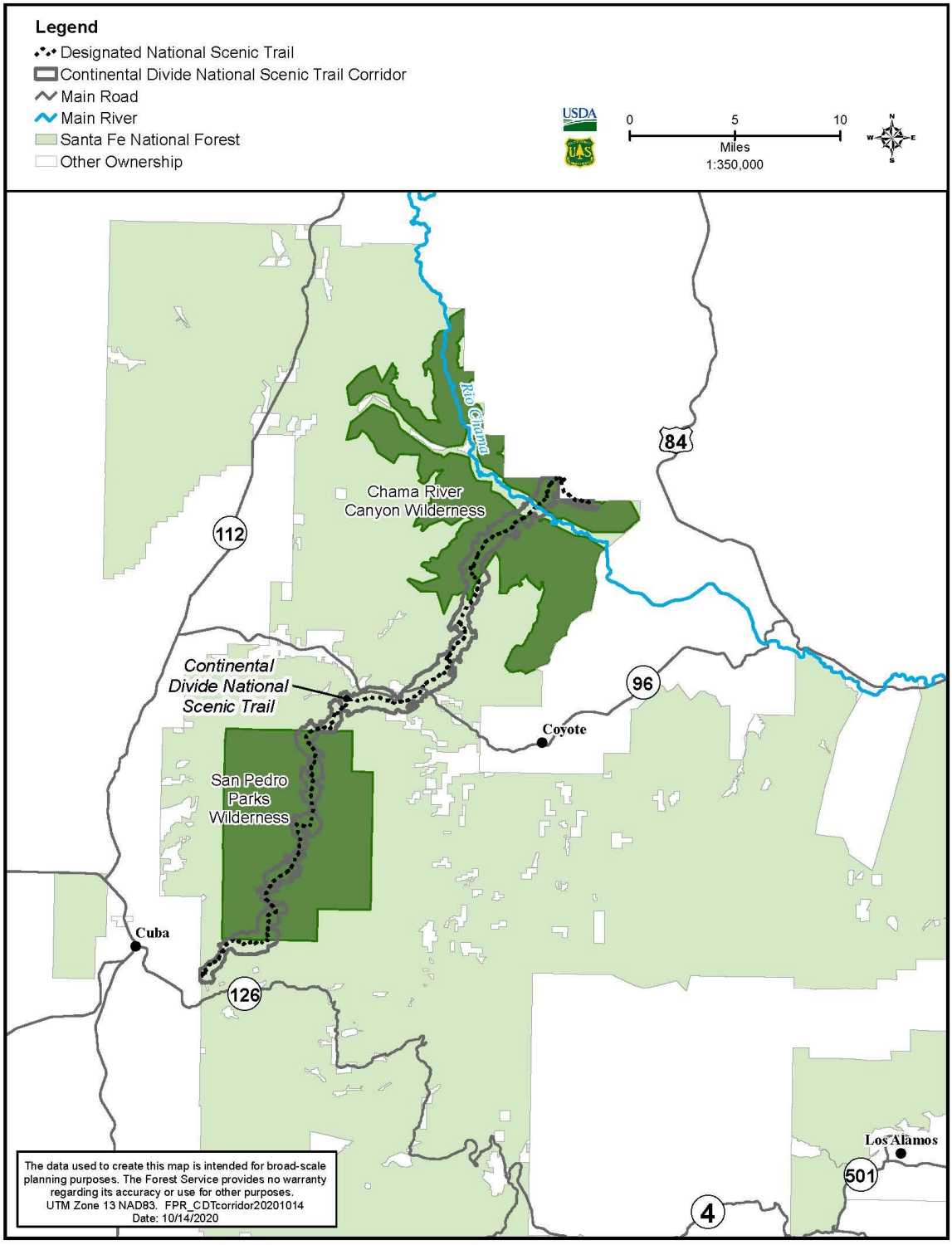


Figure 10. The Continental Divide National Scenic Trail and its corridor.
The corridor is based on the foreground viewshed (the landscape area visible from the trail based on topography) and does not go beyond one-half mile either side of the trail.

Appendix B. Fire Return Intervals

There are 11 terrestrial ERUs on the Santa Fe NF that are fire-adapted and have naturally occurring fire regimes, spanning various frequencies and intensities (see Vegetation and Fire in the FEIS). The ERUs and their associated fire return intervals are given in Table B-1, where the return interval is shown divided into low, mid, and high frequencies. Within each ERU, each frequency is paired with the number of acres that would need to be treated annually to return the ERU to its reference (historic) fire return interval.

Table B-1. Fire return intervals* for ecological response units (ERU) in Santa Fe NF

		Fire Return Interval					
ERU**	**Forest Acres by ERU**	**Most Frequent (years)**	**Acres**	**Mid Frequency (years)**	**Acres**	**Least Frequent (years)**	**Acres**
MCD	429,967	5	85,993	13	33,074	21	20,475
PPF	403,915	4	100,979	17	23,760	30	13,464
JUG	97,470	8	12,184	19	5,130	30	3,249
CPGB	41,639	10	4,164	20	2,082	30	1,388
PJG	43,356	8	5,420	22	1,971	36	1,204
MSG	17,707	2	8,854	12	1,476	22	805
PJO	231,508	30	7,717	215	1,077	400	579
SAGE	37,457	12	3,121	41	914	70	535
SFF	250,481	200	1,252	300	835	400	626
PJS	30,449	50	609	75	406	100	304
MCW	40,174	50	803	275	146	500	80
Annual Total (All ERUs):		**231,096**		**70,870**		**42,710**	

*Reference fire return intervals found in: Wright and Bailey 1982, Swetnam and Dietrich 1985, Allen 1989, Baisan and Swetnam 1990 and 1995, Dick-Peddie 1993, Gottfried et al. 1995, Grissino-Mayer et al. 1995, Floyd et al. 2000, Miller and Tausch 2000, White 2002, Muldavin et al. 2003, Floyd et al. 2004, Gruell et al. 2004, Heinlein et al. 2005, Hauser 2007, Poulos et al. 2009, Romme et al. 2009, Margolis 2014, and O'Connor et al. 2014.

** For ERU abbreviation description refer to the Forest Land Management Plan.

The values in Table B-1 were used to determine vegetation treatment acreages given in the plan objectives for vegetation (FW-VEG-0). For the MCD and non-forest ERUs, the least frequent return interval was used to define high end objectives for vegetation treatment acreages, while the high end of PPF ERU objective acres were determined from the mid-frequency fire interval. PPF was based off of the mid-frequency fire interval instead of the low-frequency fire interval due to the high degree of departure from desired conditions that currently characterizes this ERU. Furthermore, PPF makes up 24 percent of the Santa Fe NF, so by returning a natural fire return interval to this ecosystem at a faster rate, the forest at large would receive greater ecological benefit (see Vegetation and Fire in the FEIS).

Appendix B References

Allen, G.D. 1989. Changes in the landscape of the Jemez Mountains, New Mexico. University of California Berkeley.

Baison, C.H., and T.W. Swetnam. 1990. Fire history on a desert mountain range: Rincon Mountain Wilderness, Arizona, USA. *Can. J. Forest Res*. 20: 1559-1569.

Baison, C.H., and T.W. Swetnam. 1995. Historical fire occurrence in remote mountains of southwestern New Mexico and northern Mexico. In: J.K. Brown, R.W. Mutch, C.W. Spoon, and R.H. Wakimoto, (eds.), Proceedings of the Symposium on Fire in Wilderness and Park Management. USDA Forest Service Gen. Tech. Rep. INT-GTR-320. Intermountain Research Station, Ogden, UT. pp. 153–156.

Dick-Peddie, W. 1993. *New Mexico vegetation: past, present, and future*. Univ. New Mexico Press, Albuquerque.

Floyd, M.L., D.D. Hanna, and W.H. Romme. 2004. Historical and recent fire regimes in Piñon-juniper woodlands on Mesa Verde, USA. *Forest Ecology and Management* 198:269–289.

Floyd, M.L., W.H. Romme, and D.D. Hanna. 2000. Fire history and vegetation pattern in Mesa Verde National Park, Colorado, USA. *Ecological Applications* 10:1666–1680.

Gottfried, G.J., T.W. Swetnam, G.D. Allen, J.L. Betancourt, and A.L. Chung-MacCoubrey. 1995. Pinyon-juniper Woodlands. Chapter 6. Finch, D.M., J.A. Tainter, Tech. Eds. Ecology, diversity, and sustainability of the Middle Rio Grande Basin. General Technical Report PM_GTR-268. Fort Collins, CO: USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station. 186 pp.

Grissino-Mayer, H.D., C.H. Baisan, and T.W. Swetnam. 1995. Fire history in the Pinaleño Mountains of southeastern Arizona: effects of human-related disturbances. L. Debano et al. tech. coords., Biodiversity and Management of the Madrean Archipelago: The Sky Islands of Southwestern United States and Northwestern New Mexico, September 19-23, 1994, Tucson, Arizona, USDA Forest Service General Technical Report RM-GTR-264 399-407.

Gruell, G.E., L.E. Eddleman, and R. Jaindl. 1994. Fire history of the pinyon-juniper woodlands of Great Basin National Park. USDI National Park Service Technical Report NPSIPNROSUINRTR-94/01. Seattle WA. 27 pp.

Hauser, A. Scott. 2007. *Juniperus pinchotii*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available: http://www.fs.fed.us/database/feis/ accessed May 11, 2018.

Heinlein, T.A., M.M. Moore, P.Z. Fulé, and W.W. Covington. 2005. Fire history and stand structure of two ponderosa pine-mixed conifer sites: San Francisco Peaks, Arizona, USA. *International Journal of Wildland Fire* 14:307–320.

Margolis, E.Q. 2014. Fire regime shift linked to increased forest density in a piñon–juniper savanna landscape. *International Journal of Wildland Fire* 23:234–245.

Miller, R.F., and R.J. Tausch. 2000. The role of fire in pinyon and juniper woodlands: a descriptive analysis. Pages 15–30 in Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species. Fire conference.

Muldavin, E, C. Baisan, T. Swetnam, L. DeLay, and K. Morino. 2003. Woodland Fire History Studies in the Oscura and Northern San Andres Mountains, White Sands Missile Range, New Mexico. Final report. WNR-ES-ES Research Study No. 92F018. White Sands Missile Range, New Mexico.

O'Connor, C.D., D.A. Falk, A.M. Lynch, and T.W. Swetnam. 2014. Fire severity, size, and climate associations diverge from historical precedent along an ecological gradient in the Pinaleño Mountains, Arizona, USA. *Forest Ecology and Management* 329:264–278.

Poulos, H.M., R.G. Gatewood, and A.E. Camp. 2009. Fire regimes of the pinon-juniper woodlands of Big Bend National Park and the Davis Mountains, west Texas, USA. *Can. J. For. Res*. 39: 1236-1246.

Romme, W.H., M.L. Floyd, D. Hanna, and E.J. Bartlett. 2009. Historical Range of Variability and Current Landscape Condition Analysis: South Central Highlands Section, Southwestern Colorado and Northwestern New Mexico. Colorado Forest Restoration Institute.

Swetnam, T.W., and J.H. Dieterich. 1985. Fire history of ponderosa pine forests in the Gila Wilderness, New Mexico.in Proceedings—symposium and workshop on wilderness fire. Gen. Tech. Rep. INT-GTR-182, Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.

White, M.R. 2002. Characterization of, and changes in the subalpine and montane grasslands, Apache-Sitgreaves National Forests, Arizona.

Wright, H.A., and A.W. Bailey. 1982. *Fire ecology: United States and southern Canada*. John Wiley & Sons.

Appendix C. At-Risk Species and Associated Ecological Response Units

The assessment phase of forest plan revision required the development of an at-risk species list. This list included all federally listed species including endangered, threatened, candidate, and proposed species found in the forest. The assessment also identified Species of Conservation Concern (SCC). SCCs are species where best available science suggests there is considerable risk of their continued persistence in the forest. The SCC list developed by forest staff and their partners and is approved by the Regional Forester.

To assist in the development of plan components, each at-risk species on the Santa Fe NF is associated with a primary ERU where most of their life-cycle requirements are secured. Occasionally, additional ERUs are identified if they contribute to a substantial portion of their life-cycle requirements. Coarse-filter plan components address the majority of habitat needs for at-risk species, while fine-filter plan components address all other needs for at-risk species.

Scientific Name	Common Name	Associated ERUs
Mammals		
*Zapus hudsonius luteus**	NM Meadow Jumping Mouse	RIP
Cynomys gunnisoni	Gunnison's Prairie Dog	PJ systems, CPGB
Euderma maculatum	Spotted Bat	SFF, MCW
Lepus americanus	Snowshoe Hare	SFF
Martes caurina	Pacific (American) Marten	SSF, RIP
Sorex cinereus	Masked Shrew	SFF, RIP
Sorex palustris	Water Shrew	RIP
Birds		
*Strix occidentalis lucida**	Mexican Spotted Owl	PPF, MCD, MCW
Accipiter gentilis	Northern Goshawk	PPF, MCD, RIP
Aegolius funereus	Boreal Owl	SFF
Athene cunicularia hypugaea	Western Burrowing Owl	PJ systems, CPGB
Cypseloides niger	Black Swift	RIP, SFF
Falco peregrinus anatum	American Peregrine Falcon	PPF, MCD, MCW
Gymnorhinus cyanocephalus	Pinyon Jay	PJS, PJO
Lagopus leucurus	White-tailed Ptarmigan	AT
Melanerpes lewis	Lewis's Woodpecker	PPF
Amphibian		
*Plethodon neomexicanus**	Jemez Mountains Salamander	PPF, MCD, MCW
Lithobates pipiens	Northern Leopard Frog	RIP

Scientific Name	Common Name	Associated ERUs
Fish		
Oncorhynchus clarkii virginalis	Rio Grande Cutthroat Trout	RIP
Catostomus plebeius	Rio Grande Sucker	RIP
Gila pandora	Rio Grande Chub	RIP
Invertebrate		
Ashmunella ashmuni	Jemez Woodlandsnail	JUG, PPF, MCD
Gastrocopta ruidosensis	Ruidoso Snaggletooth	JUG
Pisidium lilljeborgi	Lilljeborg's peaclam	RIP
Plant		
*Ipomopsis sancti-spiritu**	Holy Ghost Ipomopsis	PPF, MCD
Abronia bigelovii	Tufted Sand Verbena	JUG, SAGE
Asclepias uncialis var. *uncialis*	Greene's Milkweed	PJO, PJG
Astragalus micromerius	Chaco Milkvetch	PJO, PJS, PJG
Calochortus gunnisonii var. *perpulcher*	Gunnison's Mariposa Lily	MSG
Cypripedium parviflorum var. *pubescens*	Large Yellow Lady's-Slipper	MCW, SFF
Erigeron subglaber	Pecos fleabane	SFF
Lilium philadelpihcum	Wood Lily	PPF
Mentzelia conspicua	Chama Blazing Star	PJO
Mentzelia springeri	Springer's Blazing Star	PJO
Draba heilii	Heil's Alpine Whitlow Grass	AT
Salix arizonica	Arizona Willow	RIP, SFF

* Denotes federally listed species.

Appendix D. Proposed Probable and Possible Future Actions

Introduction

This appendix describes some of the proposed and possible management actions that may take place in the Santa Fe NF at the project or activity level during the planning period (approximately 10 to 15 years) to maintain or move toward desired conditions as described in this plan. Proposed actions are based off objectives described in chapters 2 and 3 of the plan and are designed to be clearly measurable outcomes that advance the specified resource toward desired conditions. Possible actions are management approaches drawn from chapters 2 and 3 that describe potential actions or strategies compatible with achieving desired resource conditions and objectives. Program strategies, inventories, assessments, resource analyses, and ongoing work with partners and cooperating agencies anticipated during the next 15 years are outlined below. Any objectives listed in chapters 2 and 3 have been modified to meet the directive requirements of possible projects within a 3- to 5-year timeframe (FSH 1909.12 Chapter 22.34).

This list is not intended to be all-inclusive; it is simply a list of possible actions that may take place based on the plan objectives and management approaches. This information is not a commitment to take any action and is not a "proposal" as defined by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA). During the life of the plan, the Santa Fe is not limited to these possible actions when proposing projects and activities. A plan amendment is not required to change of modify the possible actions. These probable and possible future actions can be updated at any time through an administrative change of the plan.

Proposed Management Actions

Objectives as outlined within chapter 2 and 3 of the plan represent projects or activities intended to be accomplished during the next 3 to 5 years of the planning period. These are listed below.

All Vegetation Types

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

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

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

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

Water

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

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

Riparian and Wetland Ecosystems

Objective 1: Riparian ecosystems move toward desired conditions (less than a 33 percent departure from DC) for vegetation functional diversity, vegetation seral state, riparian corridor connectivity, and flood regime (frequency, duration, and magnitude) by implementing 15 miles of stream restoration every 10 years.[26]

Aquatic Species and Habitats

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

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

Terrestrial Species and Habitats

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

[26] Actions that could improve riparian areas would be site–specific, but could include several of the following: removing invasive plant species, stabilizing the stream channel, restoring hydrologic connectivity between stream channel and riparian area, planting native species, promoting natural revegetation of bare ground, redirecting other uses (e.g., providing other watering sources, closing areas to camping).

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

Nonnative Invasive Species

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

Forest Products

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

Sustainable Rangelands and Livestock Grazing

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

Objective 2: Maintain, improve, or install at least one water feature per year to improve water availability for wildlife or livestock where natural water sources are limited.[27.]

Developed Recreation

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

Dispersed Recreation

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

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

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

Wilderness Areas

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

Continental Divide National Scenic Trail

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

[27] These water features can serve dual purposes for both wildlife and livestock and can be done in conjunction with objective for water features in wildlife section.

Caja Del Rio Wildlife and Cultural Interpretive Management Area

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

Objective 1a: Portions of the National Historic Trails on the Caja del Rio to promote a sense of discovery for visitors.

Objective 1b: Opportunities to view and protect the unique flora and fauna in the area.

Cultural Interpretive Management Areas

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

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

Possible Management Actions

Management approaches as outlined within chapters 2 and 3 of the plan describe some of the possible management actions for achieving desired conditions and objectives. These are summarized below by resource area.

All Vegetation Types

- Consider management actions that replicate natural disturbance regimes.
- In support of restoration activities, consider using seeds or planting stock that is adapted to the ecological unit (or similar in elevation, soil type, and ecosystem) and to potential future conditions, to build resiliency in vegetative communities.
- In site-specific cases, consider scheduling management activities that result in accumulations of green slash to minimize potential impacts from bark beetles and avoiding accumulating green slash (greater than 3 inches in diameter) before overwintering beetles emerge (generally April to June) in areas highly susceptible to outbreaks.

Fire and Fuels

- Consider collaborating with stakeholders and partnering agencies early and often to successfully meet resource objectives through the use of fire while minimizing adverse impacts. Educate internally and externally the potential benefits, challenges and tradeoffs of wildland fire.
- Coordinate management of wildland fire across jurisdictional boundaries whenever there is potential for managing a wildfire or a prescribed fire on more than one jurisdiction (e.g., Federal, State, county, local, tribal governments, and land grants, etc.). This includes water sources, access, and land use agreements. This is done with the understanding that fire-adapted ecosystems and communities transcend jurisdictional boundaries. These are all foundational concepts of the collaboratively developed National Cohesive Wildland Fire Management Strategy.
- When planning and implementing fuels projects and all hazard response, work collaboratively with Federal, State, local governments, and private landowners; consider promoting public safety and reducing the risk of wildfire on lands of other ownership by

supporting the development and implementation of community wildfire protection plans (CWPPs) or similar assessments and management plans to mitigate negative impacts of wildfire. CWPPs are also important tools for mitigation efforts such as wildfire preparedness, evacuation planning, and other mitigations that will aid in wildfire response.

- When conditions facilitate safe progress toward desired conditions, consider managing naturally ignited fires to meet multiple resource objectives concurrently (i.e., protection and resource enhancement), which can change as the fire spreads across the landscape.
- Wildfire objectives are based on interdisciplinary assessment of site-specific values such as desired conditions, existing fuel conditions, current and expected weather, fire location, resource availability, social and economic considerations, and values to enhance or protect; and consider courses of action to protect or enhance those values.
- Consider the use of planned and unplanned fire in areas such as steep and rugged terrain or remote areas, as this may be the only viable tool where mechanical treatments are not feasible.
- Consider implementing treatments where they provide the most benefit (e.g., values-at-risk) and improve or maintain ecological integrity (e.g., vegetative departure).
- When managing planned ignitions, consider creating conditions that enable future unplanned ignitions to mimic their historical role or to serve as a tool to achieve resource objectives and to move ecosystems closer to desired conditions.
- In areas departed or trending away from desired conditions, consider combining the use of fire with mechanical treatments, as this is often the most effective approach to restoring forest structure and function.
- In areas highly vulnerable to climate change, consider increasing resiliency by using a diversity of treatments to facilitate natural adaptation to changing conditions such as, managing in favor of early- to mid-seral species over late-seral species in ecotones, as species characteristic of lower life zones are adapted for warmer and drier conditions. Consider managing tree basal area at the low end of the range of desired conditions to mitigate water stress.
- Consider the importance of developing practices and protocols to reduce non-prescribed human ignitions by providing timely and disseminating widely fire danger and fire restriction information. Consider educating the public on their responsibility to help reduce human-caused wildfires by providing information in the form of signage, public contacts, and fire restrictions in locations such as trailheads and designated recreation areas.
- Consider the scenic effects from prescribed fire during project planning and implementation. Blackened and scorched vegetation may be visible in project areas in the short term following treatments, but take into consideration the long-term scenic integrity objectives.
- In wildland and managed fire areas that are not expected to reseed naturally, consider seeding with native vegetation and implement other site rehabilitation practices, as necessary. Consider that fire suppression support activities and facilities (including constructed fire lines, fuel breaks and safety areas, fire camps, staging areas, heli-bases, and heli-spots), follow the same site rehabilitation practices.

- Consider collaborating with scientists (e.g., from universities, Forest Service Research and Development, U.S. Geological Survey, or Ecological Restoration Institute) and other land management agencies or organizations to conduct research on areas impacted by uncharacteristic wildfire to understand how fire has altered the ecological conditions outside the natural range of variation and develop strategies to better manage these areas.
- Consider using the Wildfire Strategic Response Zones to facilitate informed and transparent decision making that will allow beneficial fires to burn under the right conditions, and inform aggressive strategies when fires need to be suppressed. Five strategic zones were developed for the Santa Fe NF: (1) maintain, (2) restore, (3) protect, (4) exclusion, and (5) high complexity. These zones are dynamic over time and space, and will change as conditions change, affecting management opportunities. For example, an area currently identified as 'Restore' zone could become a 'Maintain' zone after treatment (mechanical or fire). Conversely, a 'Restore' zone could become a 'Protect' zone if changing fuel conditions change expected fire behavior and effect such that fire would not meet forest plan desired conditions.
- Consider providing educational resources and outreach so that residents living within and adjacent to the forest are knowledgeable about wildfire protection of their homes and property, including providing for defensible space.
- Managers should consider using a decision support process to guide and document wildfire management decisions. The process will provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions.
- Wildland fire is understood, both internally and by the public, as a necessary disturbance process integral to the function and sustainability of ecosystems.

Water Resources

- Work with local, State, and Tribal governments, land grants, non-governmental organizations, and other stakeholders to identify improvement projects, priorities for protection and management of watersheds especially in priority watersheds (Watershed Condition Class Framework), and high-quality areas (e.g., designated and eligible Wild and Scenic Rivers, Outstanding National Resource Waters, and Wetland Jewels).
- Work closely with New Mexico Environment Department on water quality management in the forest (e.g., maintaining Memorandum of Understanding, development of Total Maximum Daily Load (TMDL) determinations, developing watershed-based plans, designing and implementing 319 grants).
- Work with acequia associations and permittees to maintain diversion structures and ditches in properly functioning condition and to remedy impacts (e.g., downcut channels, enlarged channels, loss of riparian habitat) that are caused by water diversions.
- Consider opportunities to secure instream flows (water rights) for the purposes of improving or sustaining aquatic and riparian ecosystems.
- Consider developing watershed-specific plans that prioritize specific roads for decommissioning to result in improved water quality and a smaller road system (administrative or public).

Riparian and Wetland Ecosystems

- Pursue partnerships for collaborative management of riparian and wetland areas.
- Collaborate with partners to communicate the ecological significance of riparian and wetland systems to the broader public and to garner support for restoration activities.
- Consider regional riparian and aquatic ecosystem strategies when formulating riparian management actions.
- Consider underlying causes for degradation at the watershed scale when planning or implementing restoration activities.
- Consider working with partners to develop wetland action plans for headwater wetland restoration projects to addresses wetland stressors by identifying and prioritizing mitigation and restoration actions.

Aquatic Species and Habitats

- Work collaboratively with the New Mexico Department of Game and Fish, government institutions (local, State, Tribal and Federal), and other organizations, individuals, and groups to plan and implement projects for the management and research of fish and other aquatic species and their habitats.
- Work with partners to develop and implement conservation strategies beneficial to aquatic habitats (e.g., Rio Grande Cutthroat Conservation Strategy, the State Wildlife Action Plan, etc.).
- During project planning, consider management actions to mitigate the effects of long-term and short-term climate fluctuations (e.g., climate change, drought, and El Niño Southern Oscillation).
- Prioritize restoration projects based on factors such as watershed conditions, at-risk species, restoring aquatic habitat connectivity, restoration after disturbances (e.g., fire or flood), partner interest, and other immediate needs.
- Work with partners to promote public education and valuing of the aquatic wildlife in the forest.
- Consider constructing beaver dam analogues to create similar beneficial conditions for aquatic and riparian habitats as reintroducing beavers while avoiding potential conflicts with adjacent land management.

Terrestrial Species and Habitats

- Work collaboratively with the New Mexico Department of Game and Fish and other organizations, government institutions (local, State, Tribal, and Federal), individuals, and groups to plan and implement projects for the management and research of wildlife and their habitats, including Rocky Mountain bighorn sheep.
- Collaborate with other adjacent land ownership to encourage an all-lands approach at a scale that improves landscape connectivity across mixed ownerships where natural systems span multiple administrative boundaries.
- Consider seasonal road restrictions and area closures to provide refuge in small and large blocks of land for a wide range of species.

- During project planning, consider mitigations to wildlife habitat resulting from the effects of long-term and short-term climate fluctuations (e.g., global climate change, drought, El Niño Southern Oscillation), and subsequent effects of management activities.
- Work closely with New Mexico Department of Game and Fish, other enforcement agencies and local communities to reduce incidence of poaching (e.g., encourage reporting, increase signage or maintain barriers for road closures).
- Work with partners to promote public education and valuing of the terrestrial wildlife in the forest.
- Work collaboratively with New Mexico Department of Game and Fish and New Mexico Department of Transportation as well as other organizations to identify corridors to improve or maintain connectivity for terrestrial species.
- Work with partners to develop and implement conservation strategies beneficial to terrestrial habitats (e.g., the State Wildlife Action Plan, etc.).

Nonnative Invasive Species

- Coordinate with the NMDGF and other agencies and pursue partnerships to manage terrestrial and aquatic invasive species.
- Consider educating and informing the public to prevent the introduction of invasive species and limit their spread.
- Encourage research on invasive species and pathogens by universities and other organizations and agencies. Coordinate with university research and programs such as the Cooperative Extension Service through New Mexico State University.
- Consider using the most recent New Mexico Department of Agriculture's "Noxious Weed Memo and List" to identify and prioritize invasive plant management needs. The invasive species with the highest treatment priority are Class A and B noxious weeds, which have made significant increases in their overall population size in the plan area during the last 10 years.
- Consider programs to address invasive plant species using integrated pest management strategies.
- Consider encouraging public land users to inspect and clean motorized and mechanized trail vehicles of weeds and their seeds before recreating on public lands.
- Consider encouraging fishers and hunters to prevent the introduction and spread of invasive species by inspecting their equipment for invasive species and taking preventative measures (e.g., do not use felt-sole wading boots).
- Consider encouraging public pack-animal users to use pelletized, weed-free feed.

At-Risk Species

- Work collaboratively with other agencies (e.g., USFWS, NMDGF, New Mexico State Forestry, etc.), universities, and nongovernmental organizations for the research and management of at risk species. Emphasis is placed on the protection and restoration of key habitats and habitat features that lead to their recovery and persistence.

- Strive to work with partners to promote public education and valuing of the at-risk species in the forest.
- Prior to management actions, conduct surveys to identify sessile (immobile) at-risk species in areas with the following features:
  - ♦ Limestone outcropping
  - ♦ Gypsum soils
  - ♦ Sandstone blended with Todilto gypsum or limestone
  - ♦ Gray to red shales and clays of the Mancos and Chinle formations in piñon-juniper woodlands
  - ♦ Volcanic pumice and unconsolidated pyroclastic ash in piñon-juniper woodland and lower montane coniferous forests
- Consider guidance from regional or local species conservation agreements, assessments, strategies, or guidelines to improve the status of at-risk species.
- Consider using geographic information systems (GIS) as the preferred database of record to record findings of at-risk species, including negative surveys.
- In coordination with New Mexico Department of Game and Fish, consider "dusting" prairie dog colonies with flea-controlling powder to reduce the spread of sylvatic plague, or distributing sylvatic plague vaccine. When possible, identify and potentially avoid burrows occupied with at-risk species prior to application.
- Collaborate with universities, State and Federal agencies (e.g., Forest Service Research and Development, U.S. Geological Survey, Natural Resources Conservation Service, New Mexico State Forestry, New Mexico Department of Game and Fish), and other organizations (e.g., The Nature Conservancy, Natural Heritage New Mexico, Native Plant Society of New Mexico, Trout Unlimited, Audubon Society, and other non-governmental organizations), to obtain data and encourage research on rare and endemic species.
- Consider alternative measures to projects that may decrease the likelihood of disease introduction or spread to at-risk species (e.g., do not dip firefighting buckets in waterbodies where didymo or whirling disease is known to exist or install drinkers instead of earthen tanks to prevent the spread of Chytrid fungus).
- Consider working with partners to promote public education and valuing of rare and narrow endemic species in the forest.

Soil Resources

- Work collaboratively with other agencies and groups that facilitate soil conservation, watershed improvement, and research projects.
- Consider developing and promoting programs that educate the public on the importance of staying on trails and not disturbing natural plant communities including biological soil crusts (e.g., Don't Bust the Crust!).
- Consider updating the TEUI (Miller et al. 1993), which provides the basis for planning project activities. Work with the Natural Resources Conservation Service and other

partners to share data and improve existing soil information, especially after large-scale soil disturbances.

- Consider improving impaired and unsatisfactory soil condition ratings (as defined by TEUI) where management has resulted in degraded conditions:
  - To restore productivity and hydrologic function of compacted soils, consider using low ground pressure equipment.
  - To restore productivity and nutrient cycling, consider the application of soil amendments (e.g., biochar).
- Consider mitigating or restoring negative impacts in areas where concentrated use occurs on soils with severe erosion hazard rating or are poorly drained or saturated.

Air

- Work with agencies, organizations, tribes, and other entities to actively pursue actions designed to reduce the impacts of pollutants from sources within and outside the forest. These measures may include:
  - Documenting evidence of potential air quality impacts that supports initial and continued compliance with local, New Mexico, and Federal air quality regulations
  - Active membership in local and regional air quality protection stakeholder groups
  - Prevention of Significant Deterioration (PSD) permit review
  - Implementing air pollution mitigations where appropriate
  - Monitoring ambient air quality
  - Supporting visibility monitoring at San Pedro Parks
- Consider deploying instrument smoke monitors when there is potential for significant impacts to the public.
- Consider design features, best management practices, or mitigation measures to reduce fugitive dust where needed.
- When possible, consider using non-potable water for dust abatement strategies..

Partnerships

- Management approaches related to partnerships are found throughout this plan, typically as the first management approach for each resource.

Federally Recognized Tribes

- Coordinate with federally recognized tribes to develop collaborative proposals and implement projects of mutual benefit across shared boundaries, and use available federally authorized or advocated programs (e.g., Tribal Forest Protection Act of 2004 (Public Law 108-278) and the Collaborative Forest Restoration Program).
- Cooperatively develop interpretive and educational exhibits that focus on the history of the lands managed by the Santa Fe NF in collaboration with federally recognized tribes, land grant communities, and rural historic communities to provide the public with a greater understanding and appreciation of our shared history, culture, and traditions.

- Consider identifying sacred sites or traditional cultural properties, with tribal permission, and developing a strategy for appropriate recognition and management, including honoring the tribes' request for maintaining confidentiality.
- Consider providing training to forest employees so they gain an understanding of the unique government-to-government relationship between the Federal Government and federally recognized tribes; American Indian laws, customs, traditions, and values; and the tools available for protecting and managing sacred sites and traditional cultural properties.
- Refer tribal requests to collect threatened and endangered species to the U.S. Fish and Wildlife Service, the agency responsible for issuing permits for listed threatened and endangered species.
- Consider the physical and scenic integrity of places that federally recognized tribes regard as sacred sites, traditional cultural properties, or as part of important cultural landscapes when making project decisions or issuing special-use authorizations regarding the approval, location, and maintenance of facilities (e.g., telecommunication sites, ski areas, and recreational trails).
- Consider holding a workshop to inform interested tribes of Tribal Forest Protection Act provisions and opportunities for collaboration.
- Formalize working agreements with federally recognized tribes to understand their needs and build respectful, collaborative relationships; to develop ways of accomplishing mutually desired conditions and objectives; and to collaborate in ecosystem restoration efforts (such as memoranda of understanding, stewardship, and contracts).
- Consider identifying locations in the forest that can provide a setting for educating youth in culture, history, land stewardship, and the health benefits of outdoor activities.
- Consider acknowledging locations identified as important by federally recognized tribes and managing them with an emphasis on the resilience and protection of natural and cultural resources.
- Consider working with tribes to understand community needs and build respectful, collaborative relationships to achieve mutually desired conditions.
- Consider incorporating native language (e.g., Tanoan, Keres, and Athabaskan) into interpretive materials to highlight the American Indian culture as part of the landscape of the forest and its surrounding areas.

Rural Historic Communities

- Work with traditional communities and governing bodies for land grants and acequias to understand their needs and build respectful, collaborative relationships; develop collaborative proposals and implement projects of mutual benefit across shared boundaries and with shared infrastructure (e.g., boundary fences or roads); develop ways of accomplishing mutually desired conditions and objectives; and collaborate in ecosystem restoration efforts.
- Cooperatively develop interpretive and educational exhibits that focus on the history of the lands managed by the Santa Fe NF in collaboration with rural historic communities to provide the public with a greater understanding and appreciation of our shared history, culture, and traditions.

- Consider identifying forest locations that can provide a setting for educating youth in culture, history, land stewardship, and the health benefits of outdoor activities (e.g., through cooperation with cultural youth programs such as the Youth Conservation/Preservation Corps or others).
- Consider acknowledging locations identified as important by rural historic communities and managing them with an emphasis on the resilience and protection of natural and cultural resources.
- Consider providing training for forest employees to foster an understanding of the unique customs, traditions, and values of rural historic communities.
- Coordinate with rural historic communities and governing bodies for land grants and acequias to develop collaborative proposals and implement projects of mutual benefit across shared boundaries.
- Consider developing approaches for rural historic communities to continue to practice occupational- and subsistence-based activities that are sensitive to environmental and cultural concerns.
- Work with rural historic communities to identify areas where motorized and non-motorized access to resources important to cultural and traditional needs are vital.
- Consider incorporating Spanish language interpretive materials to highlight the Hispanic culture as part of the landscape of the forest and its surrounding areas.
- Consider ways to make fuelwood permits available locally in the field where the fuelwood is available or allow rural communities to get a fuelwood permit at the Forest Service district office closest to them or at another government office, rather than only at the district office administering the permitted area.
- Consider referencing the New Mexico Acequia Guidance document for clarification of authorities and responsibilities related to acequia management and governing body coordination.

Cultural and Historic Resources

- Consider maximizing opportunities for partnerships and volunteerism with the heritage program. Cooperate with local, State, and Federal agencies, as well as institutions and local federally recognized tribes in accomplishing program goals and objectives.
- Collaborate with federally recognized tribes and other traditional communities to manage historic sites and other traditional areas of importance.
- Collaborate with federally recognized tribes and other traditional communities to identify mitigation measures for historic properties, traditional cultural properties, and cultural landscapes during management activities.
- Work with partners such as the federally recognized tribes, Youth Conservation/Preservation Corps, land grants, acequias, New Mexico Historic Preservation Division SiteWatch program, Archaeological Society of New Mexico, the National Park Service, and local museums to identify, study, protect, and monitor sites and artifact collections.

- Consider measures to improve relationships with federally recognized tribes and other traditional communities.
- Consider drafting new and updating existing memoranda of understanding with federally recognized tribes as needed.
- Consider using heritage programs, interpretive presentations, publications, and interactive learning opportunities to provide the public with opportunities to learn about, understand, and experience the forest's prehistory and history.
- Consider using programs (e.g., Youth Conservation/Preservation Corps, site stewards, volunteers, and Passport in Time) that engage the public to assist in protecting, managing, and documenting cultural resources.
- Consider updating the Forest Overview and Cultural Resources Planning Assessment into a comprehensive document to include a synthesis of known cultural data as well as lists of priorities for non-project survey, national register nominations, site stabilization, interpretation, and public involvement.
- Consider restoring select historic structures for appropriate recreation or interpretive use.
- When mitigating resource deterioration, consider implementing the following protective measures: vegetation treatment in and adjacent to site boundaries (provided appropriate protection measures are in place), signing, fencing, administrative closure, patrols, interpretive signs, stabilization, or data recovery.
- Prioritize non-project-related surveys as follows: (1) areas where historic properties are threatened or ongoing impacts are unknown and need to be assessed; (2) areas indicated to have high cultural value or high density of cultural resources; (3) areas of importance to traditional communities; and (4) areas where additional survey will contribute to a greater understanding of the prehistory or history.

Forest Products

- When planning and implementing projects, work collaboratively with Federal, State, local governments, federally recognized tribes, industry, environmental groups and private landowners to promote integrated ecological and social-economic goals of harvesting forest products to support a sustainable and appropriately scaled industry.
- Consider developing and promoting public education (e.g., brochures, signs, websites, and social media) on the ecological and social impacts of illegal activities and the importance of the sustainability of these resources.
- Consider designing variably sized timber contracts to accommodate a range of operations based in northern New Mexico communities.
- During the planning process, consider uneven- or even-aged timber harvest methods that reflect the scale of natural disturbances and are designed to achieve desired conditions (e.g., size class distribution, species composition, patch size, fuel reduction, insects and disease).
- In addition to treatments in highly departed frequent fire ERUs (e.g., PPF, MCD), consider treatments within infrequent-fire ERUs (e.g., spruce-fir forest, mixed conifer with aspen, and piñon-juniper woodland) for ecological and socioeconomic benefits.

- Consider designating and managing stands of mature or over-mature piñon for the gathering of piñon nuts and potentially restrict the harvest of firewood in these stands.
- Consider using woody material that results from management activities prior to on-site burning and chipping.
- Consider making fuelwood available through public access within a project area, providing some decked woody material along roads, or allowing collection within utility corridors being thinned.
- Consider preparing pest control plans with forest health specialists that contain appropriate mitigation measures (e.g., use of resistant tree species, maintenance of species diversity, removal of damaged trees, and pesticides) and monitoring procedures. Monitoring procedures might include:
    - Measure effectiveness of treated areas;
    - Determine effects on non-target organisms;
    - Determine effects on water quality; or
    - Determine effects of pesticide that enters the soil or air.

Sustainable Rangelands and Livestock Grazing

- Forest managers cooperate, collaborate, and coordinate with permit holders to respond to changing resource conditions. Cooperation, collaboration, and coordination among Santa Fe NF and permit holders is key to improving rangeland and forest conditions for multiple uses, moving toward desired conditions, and contributing to the socio-economic wellbeing of local communities. In addition, collaboration among stakeholders is important, including local communities; permit holders; and Federal, State, county, and local government entities.
- Develop partnerships with livestock grazing permit holders, agencies (e.g., the NMDGF), and other groups and individuals to develop collaborative proposals and implement projects that benefit multiple use on the forest.
- Coordination with livestock grazing permit holders should occur at the early stages of planning and project design to include local perspectives, needs, concerns, and traditional knowledge.
- When livestock grazing is modified as a response to changing resource conditions and permit holder needs, forest managers should first consider adjusting timing (which is easier for the permit holder), followed by intensity and frequency. Consider adjusting intensity at permit renewal. In addition, collaboration among stakeholders is important including the local interdisciplinary team; permit holders; Federal, State, county and local government entities; and non-governmental organizations.
- Acknowledge the economic, traditional, and cultural importance of livestock grazing to northern New Mexico families and consider providing Forest Service employees education on the importance of this traditional practice.
- Consider emphasizing large-scale landscape approaches and treatments for restoring rangelands and the use and perpetuation of a diversity of native plant species, with an emphasis on grass, forb, and shrub communities.

- Consider using an adaptive management strategy to manage livestock grazing in a manner that promotes ecosystem resiliency, sustainability, and species diversity, based on changes in range conditions, climate, and other resource conditions. Using the adaptive management strategy provides more flexibility to grazing management, while improving or maintaining rangeland health.
- Consider inviting association members and individual permit holders on range inspections.
- Consider modifying, relocating, or removing existing range facilities in water resource features, where their presence is determined to inhibit movement toward desired riparian or aquatic conditions and consistent with existing water rights and water quality and quantity.
- Consider how ungulates (e.g., elk, deer, and livestock) have cumulative impacts on Forest resources.
- Where an allotment fence intersects a designated trail, consider using a self-closing gate (e.g., easy-to-use gate, walk-through gate, or horseback accessible) to provide access for recreation users that does not risk livestock escape.
- In wetland or riparian areas that are functional-at-risk or non-functional, consider avoiding livestock grazing in the same area during the same vegetative growth and reproduction periods (e.g., leafing, flowering, or seeding) in consecutive years to ensure that riparian pastures have vegetative recovery.
- Consider grazing aspen groves early in the season and resting in the fall, and doing a rest rotation every 2 consecutive years out of every 5 years.

All Recreation

- Develop or enhance partnerships and collaborate with agencies, groups, communities, volunteers, permit holders, and other individuals to increase forest stewardship, ecological awareness, volunteerism, and user satisfaction; promote a sustainable recreation program; and support local recreation-based economic development.
- Promote established programs and develop new conservation education programs at schools, youth activities, fairs, and volunteer events that help connect people to nature, reach underserved populations, and encourage responsible use of natural resources.
- Convene and encourage multi-stakeholder groups to address recreation maintenance concerns in specific areas.
- Collaborate with livestock permit holders and recreationists to resolve conflicts.
- Consider multilingual interpretation in recreation areas popular with non-English-speaking visitors.
- Consider incorporating information technology (e.g., quick response (QR) codes, web addresses, or interactive maps) into signs and interpretive materials to direct public to additional information.
- Consider programs to educate the public on land stewardship using minimum impact principles (e.g., Leave No Trace, Tread Lightly, or Don’t Bust the Crust!).

- Consider issuing closure orders where there is excessive resource damage or to maintain public safety.
- Consider using sustainable operations at developed recreation sites (e.g., recycling receptacles, electric maintenance vehicles, etc.).
- Consider issuing closure orders to establish a 14-day limit for overnight occupancy at the same location within the Santa Fe NF (consecutive or not) within a 90-day period, except as allowed by permit.
- Develop conservation education, visitor information, and interpretation materials to inform and engage visitors and local communities. These resources are readily available and encourage increased forest stewardship, ecological awareness, visitor orientation, and knowledge of recreation opportunities. Consider developing materials in Spanish and native languages (e.g., Tanoan, Keres, and Athabaskan).

Developed Recreation

- Consider assessing the sustainability of the developed recreation program and prioritize sites for decommissioning, closing, or repurposing the facilities.
- Consider the volume of use, resource protection needs, and opportunities for public-private partnerships, geographic distribution, and operating costs, as well as public input, to determine the operation or closure of a site.
- Consider adaptively managing recreation facilities and shifting limited program resources to prioritized sites.
- Consider repurposing closed or unused facilities (e.g., fire towers, cabins, and recreation residences) as possible recreation rentals.
- Consider posting at developed recreation sites public safety and stewardship information that includes a welcome to the site as well as rules and regulations on recreational activities.

Dispersed Recreation

- Consider developing and implementing a plan for a forestwide trail system.
- Consider programs and educational techniques (e.g., brochures, signs, websites, and social media) that promote visitor knowledge of:
    - Proper non-motorized and motorized trail use etiquette;
    - “Leave no Trace” principles;
    - Fire prevention, especially how to properly extinguish campfires; and
    - At-risk species habitat
- Consider methods that would discourage the creation and use of non-motorized user-created routes (e.g., direct recreation to NFS trails).
- Consider methods that would discourage dispersed camping near cultural sites, sensitive habitat for at-risk species, interpretive sites, and water resources.

- Consider barriers and signage to control unauthorized use in areas with a high potential for illegal cross-country motorized vehicle use.
- At heavily used dispersed recreation sites, consider monitoring use and the following actions as potential mitigations: relocation, conversion to designated dispersed campsites, providing additional bathrooms, or restricting overnight use.
- Consider posting information and barriers to redirect use and encourage public compliance in site rehabilitation efforts.
- Where forage is limited, consider providing information to encourage overnight campers with saddle or pack animals to carry weed-free cubed, pelleted, or rolled feed to limit overuse of the vegetation and discourage establishment or spread of noxious weeds.
- Consider promoting clean camping practices (e.g., Leave No Trace, Pack-It-In, Pack-It-Out) at dispersed sites.
- Work with other entities to connect trails in Santa Fe NF with other trails on or through adjacent lands.

Recreation Special Uses

- Collaborate with New Mexico Game and Fish, New Mexico Council of Outfitters and Guides (NMCOG), and other New Mexico national forests to coordinate special-use authorization consistency for outfitters and guides. Consider convening an annual meeting between forest, State, and NMCOG representatives to discuss issues and management strategies.
- Consider creating a forestwide policy for administering common recreation special-use authorizations and non-compliance issues.
- Consider conducting capacity studies to determine the number of special-use authorizations that should be issued for popular commercial recreation activities.
- Consider directing applicants desiring special-use authorizations on heavily used areas to alternative areas that can better support the desired activities.

Roads

- Collaborate with federally recognized tribes to provide additional access to locations within the Santa Fe NF beyond what is available in the MVUM (e.g., through the Tribal Forest Protection Act).
- Within project areas, prioritize decommissioning of roads and routes that are redundant, that adversely impact flow regimes, that are not used by the public, or that cause resource damage.
- Consider mitigating or closing roads that may be susceptible to landslides, rock falls, or other landslide movements and hazard trees.
- Maintain relationships and communications with internal and external customers as well as partners. Consider notifying local governments, partners, adjacent landowners, permit holders, etc., of changes in road status and significant deviations in traffic patterns.

- Prioritize road system maintenance to provide for safe travel on all roads as well as to prevent or mitigate resource damage. Consider continuing current maintenance agreements and entering into new agreements with other entities including Federal, State, tribal, and local government agencies, as well as private organizations and individuals.

Facilities

- Consider a comprehensive preventive maintenance program for buildings and infrastructure to minimize major unplanned repairs or replacements.
- Prioritize infrastructure needs and investments for current need and long-term planning goals as described in facilities master plan, sustainable recreation plan, recreation facility analysis, and other resource planning documents, and health and safety requirements for employees and visiting public. All infrastructure with employee occupancy is subject to the Occupational Safety and Health Administration standards and will be evaluated regularly to protect the health and safety of forest employees, volunteers, and the visiting public.
- Consider decommissioning potable water systems that no longer serve the current needs.
- When work is being planned for administrative facilities and infrastructure that are historic resources, work with the heritage program and partnerships to administer and maintain facilities according to the facility master plan and any developed preservation maintenance plans (historic property plans)
- Consider partnerships with local, academic, State, Federal, tribal, non-governmental organizations, and special interest groups to conduct maintenance or to repurpose excess infrastructure as outlined in facilities master plans, sustainable recreation plan, recreational facility analysis, and other resource planning documents, while following applicable standards and guidelines.
- During project planning and design, determine feasibility, cost, and benefits of using photovoltaic systems for administrative facilities, range improvements, resource monitoring, public safety, and recreation projects.

Cross-Boundary Management

- Collaborative relationships with adjacent landowners, users, and public land managers (e.g., counties, states, federally recognized tribes, and other federal agencies) are actively encouraged to develop contiguous road and trail systems across multiple ownerships.
- Collaborative relationships with traditional forest-dependent communities help ensure traditional and cultural uses are incorporated into the management of any newly acquired lands.
- Work with interested stakeholders to identify suitable parcels for acquisition and explore funding opportunities that leverage the Land and Water Conservation Fund, grant opportunities, and private financing.

Realty and Access

- Consider encouraging the protection of existing public access and the acquisition of new access opportunities to NFS lands.

- Consider updating the existing landownership adjustment plan, which will identify lands desirable for acquisition, as well as identify parcels or areas as suitable for exchange or sale.
- On easements acquired from private landowners, consider prioritizing public access interests over road closures.
- Consider using the following criteria to prioritize boundary management surveys:
  - Where known litigation is pending, a title claim has been asserted, encroachments are suspected, or the probability of encroachment can be reduced.
  - Where significant resource values exist and use or manipulation of resources is planned (this includes the location, by survey, of easements necessary for resource management).
  - To ensure that any project that occurs near or adjacent to any NFS boundary line does not proceed until the legal NFS boundaries are properly located and physically marked in the field prior to any management action.
  - To help prevent boundary disputes or loss of NFS land and its resources.
  - When all remaining property boundary lines have not been previously surveyed.

Lands Special Uses

- Consult with local governments to synchronize forest decisions for authorizations, permits, leases, and easements with local planning and zoning ordinances where local and forest objectives are complementary.
- Identify locations suitable for commercial filming for inclusion in a 'menu' of options subject to streamlined authorization.
- Recognize and grant priority status to applications for utility developments in existing transmission corridors that transmit energy from renewable sources.

Renewable Energy

- Consider identifying areas suitable for solar and wind energy based on energy potential, access, and impacts on other resources. Encourage development of wind and solar energy in these areas.
- Consider encouraging renewable energy devel9pment in areas with the highest generation potential and fewest resources conflicts by:
  - providing financial incentives to developers, including less frequent adjustments to rent and longer phase-ins for other fees;
  - allowing standard bonds as opposed to bonds based on full reclamation costs;
  - awarding leases in these areas through competitive processes; and
  - streamlining the leasing process by, for example, granting applicants site control earlier.

- Upon receipt of application for development of solar and wind energy facilities, consider modification of road designations and relocation to accommodate development of these renewable energy-producing facilities.

Solid Minerals

- Collaborate with the New Mexico Department of Game and Fish on pre-closure inspections of underground mines to determine if cave-dependent species are present, and if so, to determine how to design and implement a closure that addresses the needs of resident or historically occurring wildlife within the constraints of meeting public safety concerns.
- Prior to the destruction of access to adits, shafts, and other mine workings, consider providing opportunities to record mineral resource information when safe.

Caves

- Collaborate with other State and Federal agencies, non-governmental organizations, and universities as well as local, regional, and national speleological societies to identify significant caves, obtain data, encourage research on karst environments and karst-dependent species, and develop conservation strategies for protecting karst-dependent species and their habitats.
- Consider limiting logging, road construction, and other uses of heavy equipment above or in the vicinity of a cave with a thin roof, or the course of such a cave, if there is potential for damage.
- Consider retaining vegetation in the vicinity of a cave or cave course to protect the cave's microenvironment.
- If timber harvesting is permitted near a cave, consider directionally felling trees away from a cave and its course.
- Consider avoiding altering cave entrances or using them as disposal sites for slash, spoils, or other refuse.
- Consider limiting management activities within any area draining into a cave, as they may affect the cave ecosystem with sedimentation; soil sterilization; the addition of nutrients or other chemicals, including pesticides, herbicides, and fertilizers; or change the cave's natural hydrology.
- Consider avoiding the diversion of surface drainage into caves.
- Consider limiting public access to prevent damage to cave resources, when there are unusual safety hazards, or when it is necessary to prevent the spread of diseases such as white-nose syndrome.
- Consider avoiding advertising the location of caves to the general public in printed documents or with signs.
- Consider prohibiting camping and campfires within 200 feet of cave entrances, mines, and rock shelters used by at-risk species.
- Consider developing prescribed burn plans to avoid or minimize smoke influences at or around at-risk species bat caves.

- Consider recognizing and documenting karst features when they are found to occur across the landscape; these features include caves, springs, sinkholes, and losing streams.
- Consider incorporating measures for protecting caves into project plans for road construction, timber harvest, tree planting, blasting near caves, and any activity that could change cave temperatures and drainage patterns.

Scenic Resources

- Cooperate with other entities, such as the New Mexico Department of Transportation, tribal and local governments, and commercial and private entities to protect scenic integrity on and adjacent to the national forest, including along scenic byways.
- Consider developing public education opportunities and information about the importance and impacts of scenery.
- Consider providing the Scenery Management Inventory and Scenic Integrity Objective map to neighboring land management agencies for integration into projects and plans. These maps can be provided to others as interest is expressed for them.
- Consider best environmental design practices to advance environmentally sustainable design solutions (e.g., Sustainable Recreation Site Design Guide).
- Consider using the Forest Service Built Environment Image Guide in construction or reconstruction of Forest Service facilities to ensure consistency with the scenic character of the Southwestern Region.
- Set priorities for scenic integrity rehabilitation considering the following:
    - Foreground (within 300 feet to 0.5 mile) of high public use areas has the highest priority;
    - Amount of deviation from the scenic integrity objectives;
    - Length of time it would take natural processes to reduce the visual impacts so that they meet the scenic integrity objectives;
    - Length of time it will take rehabilitation measures to meet the scenic integrity objectives;
    - Benefits to other resource management objectives to accomplish rehabilitation;
    - Restoration of scenic integrity in areas where it has been negatively impacted as other project work is accomplished or funds are available; and
    - Where existing scenic integrity is lower than the scenic integrity map.
- Prior to vegetation work in developed recreation sites or administrative facilities, consider developing vegetation management plans that outline activities to sustain the desired scenic character and key visual elements over time.
- Consider the following types of activities to enhance scenic resources; restore grasslands and aspen, decommission or rehabilitate unneeded and unauthorized system roads and routes, remove unnecessary fences, and paint facilities along scenic byways.

Wilderness Areas

- Collaborate with local partners, volunteers, Adopt-a-Trail organizations, and other entities to maintain wilderness, including trails maintenance and construction.
- Coordinate with the New Mexico Department of Game and Fish on management of wildlife within wilderness using techniques consistent with preserving wilderness character.
- Wilderness management is guided by the elements outlined in the Forest Service's Wilderness Stewardship Performance or other current guidance. This framework tracks how well the wilderness character is being preserved through measuring progress in 10 elements selected by managers for each wilderness from a suite of possible options (e.g., management of fire, range, and cultural resources).
- Consider adaptive management and corrective measures if overuse causes unacceptable resource damage or unacceptable loss of opportunities for solitude. Use proactive approaches in identifying and addressing visitor use management challenges before effects to resources become unacceptable.
- Prioritize the decommissioning, realignment, or reconstruction of trails in designated wilderness areas based on need, the amount of use it receives, and potential impacts on wilderness character and recreation opportunities.
- Consider using methods to prevent unauthorized use in wilderness such as education, law enforcement, barriers, road closures, and trail design.
- Consider dispatching a Resource Advisor-Fire Line (REAF) or Resource Advisor (READ) with a specialized knowledge of wilderness, or wilderness program specialist in the absence of a wilderness REAF or READ, to fires threatening wilderness.
- Consider using interpretation and education to encourage visitors to adopt techniques, equipment, and ethics specific to wilderness.
- Consider educating boaters on relevant safety and resource protection regulations before they enter the Chama River Canyon Wilderness. Post these regulations at river access points and include them in outfitter-guide special-use authorizations.
- Consider using news releases, postings, permit issuance, and individual visitor contacts to inform visitors of areas of concentrated resource damage and use restrictions.
- Consider rehabilitating human-caused disturbed areas (e.g., compacted sites) that are inconsistent with maintaining the natural appearance component of wilderness character.
- Consider reintroducing extirpated (locally extinct) or restoring populations of native species when consistent with ecological conditions and social values.
- Consider clearly identifying wilderness boundaries through signage at official entry points and needed locations (such as informal access points), with features such as trail maps, boundary markers, and consistent signage.
- Consider removing non-conforming structures from wilderness that are no longer in use and do not meet the desired conditions.

Inventoried Roadless Areas

- Prioritize roads in IRAs for road decommissioning.

Research Natural Areas

- Collaborate with appropriate agencies and universities regarding scientific opportunities of RNAs.
- Encourage partnerships and volunteers to provide onsite interpretation and monitoring for the RNAs.
- Consider marking the boundary of the RNA and using kiosks to educate the public about the RNA purpose, permitted, and prohibited activities.

Wild and Scenic Rivers

- Coordinate planning and management of the boating aspects of the Rio Chama with the Bureau of Land Management (BLM), in consultation with interested stakeholders, such as the Bureau of Reclamation; the Army Corps of Engineers; New Mexico Department of Game and Fish; and U.S. Fish and Wildlife Service.

Jemez National Recreational Area

- Work with volunteer groups, partners, local governments, and adjacent landowners to:
  - protect the condition and character of the surrounding landscape, and
  - facilitate support that promotes 'Leave No Trace' principles and reduces user conflicts.

Caja del Rio Wild Horse Territory

- Consider developing partnerships with other Federal Government agencies such as the Bureau of Indian Affairs, Animal and Plant Health Inspection Service, Fish and Wildlife Service, the State of New Mexico, universities, cattle and range organizations, advocate organizations, federally recognized tribes, adjacent landowners, and grazing permittees.
- Consider developing an AML and management plan, including coordinating with the BLM and the Pueblo of Cochiti.
- Monitor horse numbers within active territories at least every 3 to 4 years.

Significant Caves

- Consider measures to prevent human-caused changes in cave ecosystem, water, sediment, nutrient, chemical, airflow, humidity, or temperature regimes.

Continental Divide National Scenic Trail

- Work with volunteer groups; partners; ; Federal, State, Tribal, and local governments; and adjacent landowners to maintain CDNST corridors, the condition and character of the surrounding landscape, and to facilitate CDNST user support that promotes 'Leave No Trace' principles and reduces user conflict.
- Consider working with partners to promote public education about the history, purpose, and benefits of the CDNST.

- Consider ensuring that incident management teams are aware of the CDNST as a resource to be protected during wildfire suppression activities. Consider clearly identifying fire suppression rehabilitation and long-term recovery of the CDNST corridor as high priorities for incident management teams, burned area emergency response teams, and post-fire rehabilitation interdisciplinary teams.
- Consider establishing appropriate visitor use levels for specific segments of the CDNST and taking appropriate actions if there is a trend away from the desired condition.
- Consider evaluating proposed trail relocations or new trail segments (e.g., using methods such as the Optimal Location Review process for substantial trail locations) for the CDNST, including to locate the CDNST as close as possible to the geographic Continental Divide.
- Consider identifying and pursuing opportunities to acquire lands or rights-of-way within or adjacent to the CDNST as they become available.
- Consider providing consistent signage along the CDNST corridor at road crossings to adequately identify the trail and including interpretation at trailheads.
- Consider using side and connecting trails to access points of interest or supplying points away from the CDNST.

National Historic Trails

- Rely on the cooperative management efforts and support of State, local, and private interests, including trail advisory councils, to ensure the protection of trail-related resources, to provide outdoor recreational opportunities, to maintain and build trail facilities, and to accomplish the objectives of interpretive programs with a focus on assisting visitors to understand and appreciate the trails' history and significance.
- Consider inventory and identification of intact trail segments (including reroutes and alternative alignments) in coordination with the National Park Service and Bureau of Land Management, as appropriate. Consider working collaboratively to ensure that signs installed along the route follow the sign plan indicated in each trail's comprehensive plan.
- Request a landscape architect or other scenery specialist to analyze all proposed projects for impacts to scenery in all distance zones (foreground, middleground, and background) associated with an NHT corridor.
- Consider implementing controlled surface use stipulations within the trail corridor on Federal lands and on lands of other ownership where Federal subsurface rights exist.

National Recreation Trails

- Work with volunteer groups, partners, local governments, and adjacent landowners to:
    - ♦ maintain trail corridors,
    - ♦ maintain the condition and character of the surrounding landscape, and
    - ♦ facilitate support by trail users that promotes 'Leave No Trace' principles and reduces user conflict.

Scenic Byways

- Work with the New Mexico Department of Transportation and county highway departments to manage hazard trees within the immediate foreground of scenic byways (up to 300 feet on either side).
- Work with the New Mexico Department of Transportation, the Federal Highway Administration, and local communities to improve services and interpretive opportunities on byways.
- Consider using signs, kiosks, exhibits, and other educational tools (e.g., brochures, auto tours, websites, and social media) to provide interpretive, educational, and safety information along scenic byways, in adjacent recreation sites, and at visitor contact points (e.g., ranger stations).

Caja Del Rio Wildlife and Cultural Interpretive Management Area

- Use cross-agency collaboration (e.g., National Park Service, Bureau of Land Management, Cochiti Pueblo, and Los Alamos National Laboratory) and tribal consultation to facilitate wildlife connectivity and protection of important archaeological, cultural, and sacred sites.
- Consider closures (e.g., for activities such as target shooting or drone use) to protect wildlife and maintain increased potential for wildlife-viewing opportunities.
- Consider conducting condition assessments and developing stabilization plans on significant ancestral pueblos.
- Consider discouraging take-off and landing of drones in or near canyons to avoid effects to at risk wildlife species.

Cañada Bonita Recommended Research Natural Area

- Collaborate with appropriate agencies and universities regarding scientific opportunities.
- Encourage partnerships and volunteers to provide onsite interpretation and monitoring.
- Consider marking the boundary of the Cañada Bonita RNA and using kiosks to educate the public about the area's purpose, and permitted and prohibited activities.

Cultural Interpretive Management Areas

- Coordinate with federally recognized tribes and pueblos, and local communities to discuss local access and needs on the sites, construction of trails, and development of interpretive materials.
- Consider providing a Forest Service representative (e.g., staff, law enforcement, volunteers, tribal members) at the sites during high-use holiday weekends to ensure site protection as well as provide interpretive information.
- Consider an intensive cultural resource survey of the entire management area to document the full extent of the site itself and better understand its context in the surrounding landscape.
- Consider developing a management plan for the interpretation and stabilization of each site, including:
    - A baseline condition and stabilization needs assessment of the sites, and

- ♦ Periodic follow-up assessments every 2 years to evaluate the impacts to the sites.

Oil and Gas Leasing Management Area

- Consider working with the New Mexico Department of Game and Fish to identify where and when timing limitations are implemented pertaining to deer and elk winter range and deer and elk fawning and calving habitat.

Eligible Wild and Scenic Rivers

- Opportunities for enhancing ORVs may be considered in all project management activities within an eligible wild and scenic river corridor.

Appendix E. Relevant Laws, Regulations, and Policy

The operating environment for managing NFS lands comes from a variety of sources. This appendix contains a partial listing of relevant statues, regulations, policies, and agreements which impact land management on the Santa Fe NF. Santa Fe NF projects and activities are developed to be consistent with the direction found in the plan, as well as applicable laws, regulations, and executive orders. Other relevant sources that provide varying levels of guidance include, but are not limited to, Forest Service Handbooks and Manuals, programmatic agreements, memoranda of understanding, memoranda of agreement, and existing decisions.

Federal and State Statutes

The following is a partial list of relevant laws which have been enacted by Congress. A Federal statute, or law, is an act or bill which has become part of the legal code through passage by Congress and approval by the President (or via congressional override). Although not always specified below, many of these laws have been amended.

American Indian Religious Freedom Act (AIRFA) as amended (42 U.S.C. 1996)

Protects and preserves for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use, and possession of sacred objects and the freedom to worship through ceremonial and traditional rites.

Americans with Disabilities Act of 1990

Provides a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities; for clear, strong, consistent, and enforceable standards addressing discrimination against individuals with disabilities; to ensure that the Federal Government plays a central role in enforcing the standards established in this act on behalf of individuals with disabilities; and to invoke the sweep of congressional authority, including the power to enforce the fourteenth amendment and to regulate commerce, in order to address the major areas of discrimination faced by people with disabilities.

Anderson-Mansfield Reforestation and Revegetation Act of October 11, 1949

Provides for the reforestation and revegetation of National Forest System lands and other lands under the administration or control of the Forest Service.

Antiquities Act of 1906 (16 U.S.C. 431-433)

Prevents the appropriation, excavation, injury, or destruction of any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the United States, without permission. Provides for permits, for misdemeanor-level penalties for unauthorized use, and authorizes the President to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon lands owned or controlled by the United States to be national monuments, and to reserve as a part thereof parcels of land needed for the proper care and

management of the objects to be protected. The Archaeological Resources Protection Act has replaced the Antiquities Act as the authority for special-use permits if the resource involved is 100 years old or greater.

Archaeological and Historic Preservation Act of 1974 (AHPA) (16 U.S.C. 469)

This act is also known as the Archaeological Recovery Act. AHPA amended and expanded the Reservoir Salvage Act of 1960 and was enacted to complement the Historic Sites Act of 1935 by providing for the preservation of significant scientific, historical, and archaeological data which might be lost or destroyed as the result of the construction of a federally authorized dam or other construction activity. AHPA also allows for any Federal agency responsible for a construction project to appropriate a portion of project funds for archaeological survey, recovery, analysis, and publication of results.

Archaeological Resources Protection Act of 1979 as amended (ARPA) (16 U.S.C. 470 aa et seq.)

The act establishes permit requirements for removal or excavation of archaeological resources from Federal and Indian lands. Provides criminal and civil penalties for the unauthorized excavation, removal, damage, alteration, defacement, or the attempted unauthorized removal, damage, alteration, or defacement of any archaeological resource more than 100 years of age found on Federal or Indian lands. Prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained from public lands or Indian lands. The act further directs Federal land managers to survey land under their control for archaeological resources and create public awareness programs concerning archaeological resources.

Section 470ii (c): States that "each federal land manager shall establish a program to increase public awareness of the significance of the archaeological resources located on public lands and Indian lands and the need to protect such resources." It further directs that an annual report of such progress will be submitted to Congress.

Section 470mm: Directs Federal agencies to:

> "develop plans for surveying lands under their control to determine the nature and extent of archaeological resources on those lands; prepare a schedule for surveying lands that are likely to contain the most scientifically valuable archaeological resources; and develop documents for the report of suspected violations of this act and establish when and how those documents are to be completed by officers, employees, and agents of their respective agencies."

Bald and Golden Eagle Protection Act of 1940, as amended

The act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald and golden eagles, including their parts, nests, or eggs. The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturbance includes impacts that result from human-induced alterations in the nesting area even when eagles are not present. Sections 22.26—28 allow take of bald and golden eagles or their nests where it is unavoidable and where it is compatible with the continued preservation of the eagle. Permits for take are issued based on certain criteria such as, but not limited to, certifications, reporting, and monitoring.

Bankhead-Jones Farm Tenant Act of July 22, 1937, as amended

Authorized Federal Government to purchase invaluable land and rehabilitate to the forest needs. It also helped tenant farms take care of their land.

Clarke-McNary Act of 1924

Allowed for easier purchase of land intended for Forest Service use and gave a strong action for state offices to open to represent the Forest Service.

Clean Air Act of August 7, 1977, as amended (1977 and 1990) 42 U.S.C. §7401 et seq. (1970)

Enacted to protect and enhance the quality of the Nation's air resources; to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution; to provide technical and financial assistance to state and local governments in connection with the development and execution of their air pollution prevention and control programs; and to encourage and assist the development and operation of regional air pollution prevention and control programs.

Clean Water Act (see Federal Water Pollution Control Act)

Clean Water Restoration Act of 1966

Authorizes the Secretary of Interior to conduct a comprehensive study of the effects of pollution, including sedimentation, sport and commercial fishing, recreation, water supply and power, and other specified uses

Common Varieties of Mineral Materials Act of July 31, 1947

Authorizes the Secretaries of the Interior and Agriculture, under such rules and regulations as they may prescribe, to dispose of common variety mineral materials (including but not limited to sand, stone, gravel, pumice, pumicite, cinders, and clay) and vegetative materials (including but not limited to yucca, manzanita, mesquite, cactus, and timber or other forest products) on public lands of the United States, if the disposal of such materials is not otherwise expressly authorized by law, is not expressly prohibited by laws of the United States, and would not be detrimental to the public interest.

Cooperative Forestry Assistance Act of July 1, 1978

Authorizes the Secretary of Agriculture to assist in the establishment of a coordinated and cooperative Federal, state, and local forest stewardship program for the management of non-Federal forest lands and forest lands in foreign countries.

Emergency Flood Prevention Act (Agricultural Credit Act) of August 4, 1978

Authorizes the Secretary of Agriculture to undertake emergency measures for runoff retardation and soil erosion prevention, in cooperation with landowners and users, as the Secretary deems necessary to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood, or other natural occurrence is causing or has caused a sudden impairment of that watershed.

Endangered American Wilderness Act of 1978

Designated 50,000 acres as the Chama River Canyon Wilderness in the SF and Carson National Forest which was part of a bigger concern for preservation of wildlife and quality of habitats.

Endangered Species Act of 1973, as amended

Authorizes the determination and listing of species as endangered and threatened; prohibits unauthorized taking, possession, sale, and transport of endangered species; authorizes the assessment of civil and criminal penalties for violating the act or regulations; and, authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the act or any regulation issued thereunder. Section 7 of the act requires Federal agencies to use their authorities to carry out programs for the conservation of endangered and threatened species and to insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or adversely modify their critical habitat.

Section 4 of the act directs the development and implementation of recovery plans for threatened and endangered species and the designation of critical habitat. Several species listed under the act are found on the Santa Fe NF, some with recovery plans and some with designated critical habitat. Those with a recovery plan and/or a critical habitat designation are listed below:

Mexican Spotted Owl Recovery Plan
Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Mexican Spotted Owl; Final Rule
Final Recovery Plan Southwestern Willow Flycatcher
Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Southwestern Willow Flycatcher; Final Rule

Energy Independence and Security Act of December 19, 2007

Reinforces the energy reduction goals for federal agencies put forth in Executive Order 13423, as well as introduces more aggressive requirements. The three key provisions enacted are the Corporate Average Fuel Economy Standards, the Renewable Fuel Standard, and the appliance/lighting efficiency standards.

Energy Policy Act of 2005

Requires the Secretary of Agriculture to ensure timely action on oil and gas permits, improve collection and retrieval of oil and gas information, and improve inspection and enforcement of permit terms (Section 362).

Energy Security Act of June 30, 1980

Authorizes the Secretary of Agriculture to make available timber resources of the National Forest System, in accordance with appropriate timber appraisal and sale procedures, for use by biomass energy projects.

Environmental Quality Act (1970)

This act sets forth a national policy for the environment which provides for the enhancement of environmental quality. Congress recognizes there has been changes to the environment and sets out to improve quality and quantity of healthy environments across the United States.

Federal Advisory Committee Act of October 6, 1972

Sets standards and uniform procedures to govern the establishment, operation, administration, and duration of advisory committees.

Federal Cave Resources Protection Act of November 18, 1988

Established requirements for the management and protection of caves and their resources on Federal lands, including allowing land managing agencies to withhold the location of caves from the public, and requiring permits for any removal or collecting activities in caves on Federal lands.

Federal Insecticide, Rodenticide, and Fungicide Act of October 21, 1972

Requires the administrator of the Environmental Protection Agency to prescribe standards for the certification of individuals authorized to use or supervise the use of any pesticide that is classified for restricted use; regulates the sale of restricted use pesticides; and provides penalties for the unauthorized use or sale of restricted use pesticides.

Federal Land Policy and Management Act of October 21, 1976

Requires that public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use. Also states that the United States shall receive fair market value of the use of the public lands and their resources unless otherwise provided for by law.

Federal Noxious Weed Act, 1974, as amended

Authorizes the Secretary of Agriculture to designate plants as noxious weeds by regulation; to prohibit the movement of all such weeds in interstate or foreign commerce except under permit; to inspect, seize and destroy products, and to quarantine areas, if necessary to prevent the spread of such weeds; and to cooperate with other Federal, state and local agencies, farmers associations, and private individuals in measures to control, eradicate, prevent, or retard the spread of such weeds.

Federal Power Act of June 10, 1920

Created federal regulations concerning hydroelectric projects and the Federal Energy Regulatory Committee (FERC) was deemed as the licensing authority of future plants.

Federal-State Cooperation for Soil Conservation Act of December 22, 1944

Authorized the adoption of eleven watershed improvement programs in various states for the improvement of water runoff, water flow retardation, and soil erosion prevention.

Federal Water Pollution Control Act and Amendments of 1972 (Clean Water Act) Public Law 92-500, as amended in 1977 (Public Law 95-217) and 1987 (Public Law 100-4)

Enacted to restore and maintain the chemical, physical, and ecological integrity of the Nation's waters. Provides for measures to prevent, reduce, and eliminate water pollution; recognizes, preserves, and protects the responsibilities and rights of States to prevent, reduce, and eliminate pollution, and to plan the development and use (including restoration, preservation, and enhancement) of land and water resources; and provides for Federal support and aid of research relating to the prevention, reduction, and elimination of pollution, and Federal technical services and financial aid to state and interstate agencies and municipalities for the prevention, reduction, and elimination of pollution.

Established goals for the elimination of water pollution; required all municipal and industrial wastewater to be treated before being discharged into waterways; increased Federal assistance for municipal treatment plant construction; strengthened and streamlined enforcement policies; and expanded the Federal role while retaining the responsibility of states for day-to-day implementation of the law. In New Mexico, the designated agency for enforcement of the Clean Water Act is the New Mexico Environmental Department (NMED). Relevant sections of the Clean Water Act:

- CWA Sections 208 and 319 recognize the need for control strategies for non-point source pollution.
- CWA Section 303(d) requires waterbodies with water quality determined to be either impaired (not fully meeting water quality standards for designated uses) or threatened (likely to violate standards in the near future) to be compiled by NMED in a separate list, which must be submitted to EPA every 2 years. These waters are targeted and scheduled for development of water quality improvement strategies on a priority basis.
- CWA Section 305(b) requires that states assess the condition of their waters and produce a biennial report summarizing the findings.

Federal Water Project Recreation Act of July 9, 1965

Requires that recreation and fish and wildlife enhancement opportunities be considered in the planning and development of Federal water development.

Fish and Wildlife Conservation Act of September 15, 1960

Requires the Secretaries of the Interior and Agriculture, in cooperation with state agencies, to plan, develop, maintain, and coordinate programs for the conservation and rehabilitation of wildlife, fish, and game on public lands under their jurisdiction.

Fish and Wildlife Coordination Act of March 10, 1934

Authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with other Federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The Act also authorizes the preparation of plans to protect wildlife resources, the completion of wildlife surveys on public lands, and the acceptance by Federal agencies of funds or lands for related purposes provided that land donations receive the consent of the state in which they are located.

Food, Conservation & Energy Act of 2008 (2008 Farm Bill) Public Law 110-246 Title VIII – Forestry, Subtitle A, B, and C.

Subtitle A: Amendment to the Cooperative Forestry Assistance Act of 1978. Establishes national priorities for private forest conservation, a community forest and open space conservation program, and a Secretary level forest resources coordinating committee.

Subtitle B: Cultural and Heritage Cooperation Authority. Authorizes the Secretary of Agriculture to provide forest products to Indian tribes for traditional and cultural purposes; to protect the confidentiality of certain information, including information that is culturally sensitive to Indian tribes; to utilize National Forest System land for the reburial of human remains and cultural items, including human remains and cultural items repatriated under the Native American Graves Protection and Repatriation Act; prevent the unauthorized disclosure of information regarding human remains or cultural items reburied on National Forest System land; to ensure access to National Forest System land, to the maximum extent practicable, by Indians and Indian tribes for traditional and cultural purposes; to increase the availability of Forest Service programs and resources to Indian tribes in support of the policy of the United States to promote tribal sovereignty and self-determination; and to strengthen support for the policy of the United States of protecting and preserving the traditional, cultural, and ceremonial rites and practices of Indian tribes, in accordance with the American Indian Religious Freedom Act (42 U.S.C. 1996).

Subtitle C: Amendments to Other Forestry Related Laws. Amends the Lacey Act to include the illegal taking of plants, establishes an Emergency Forest Restoration Program, and renews authority and funding for the Healthy Forest Reserve Program.

Forest Highways Act of August 27, 1958

Requires that funds available for forest development roads and trails be used by the Secretary of Agriculture to pay for the costs of construction and maintenance thereof, including roads and

Appendix D. Relevant Laws, Regulations, and Policies, and Other Sources of Information trails on experimental and other areas under Forest Service administration, or for adjacent vehicular parking areas and sanitary, water, and fire control facilities. Authorizes the Secretary of Agriculture to enter into contracts with a state or civil subdivision thereof, and issue such regulations, as he deems desirable. See also Highways (23 USC Chapter 205 Forest development roads and trails).

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974, as amended by National Forest Management Act of 1976 (16 U.S.C. 1600-1614, 472a)

Directs the Secretary of Agriculture to prepare a renewable resource assessment every 10 years; to transmit a recommended renewable resources program to the President every 5 years; to develop, maintain, and, as appropriate, revise land and resource management plans for units of

the National Forest System; and to ensure that the development and administration of the resources of the National Forest System are in full accord with the concepts of multiple use and sustained yield.

Freedom of Information Act of November 21, 1974

Governs which government records are released to the public either automatically or upon request.

Healthy Forests Restoration Act of 2003 (H.R. 1904)

Purposes are to reduce wildfire risk to communities and municipal water supplies through collaborative hazardous fuels reduction projects; to assess and reduce the risk of catastrophic fire or insect or disease infestation; to enhance efforts to protect watersheds and address threats to forest and rangeland health (including wildfire) across the landscape; to protect, restore, and enhance forest ecosystem components such as biological diversity, threatened/endangered species habitats, and enhanced productivity.

Granger-Thye Act of 1950

Authorizes range improvements from appropriated funds and allows the Forest Service to authorize grazing advisory boards and to issue grazing permits for periods not exceeding 10 years.

Highway Safety Act of 1966 (S. 3052)

The Department of Transportation was introduced for each regulatory state, which implemented driver education, license regulations, vehicle registration, and roadway and highway maintenance.

Historic Sites Act of 1935 (16 U.S.C. 461)

Establishes a policy to preserve for public use historic sites, buildings, and objects of national significance for the benefit of the people. Authorizes the National Park Service's National Historic Landmarks Program.

Intergovernmental Cooperation Act of October 16, 1968 (31 U.S.C. 6505)

The act permits Federal agencies to provide specialized or technical services to state and local units of government.

Joint Surveys of Watershed Areas Act of September 5, 1962

Authorizes the Army and the Secretary of Agriculture to jointly investigate watershed areas for flood prevention, conservation, development, and utilization.

Knutson-Vandenberg Act of June 9, 1930

Allowed the forest to hold timber companies accountable for the reforestation of heavily timber used forested areas.

Land Acquisition Act of March 3, 1925

Authorizes the Secretary of Agriculture to purchase land for national forest headquarters, ranger stations, dwellings, or other sites required for the effective performance of the authorized activities of the Forest Service.

Land and Water Conservation Fund Act of September 3, 1964

Authorizes the appropriation of funds for Federal assistance to states in planning, acquisition, and development of needed land and water areas and facilities and for the Federal acquisition and development of certain lands and other areas for the purposes of preserving, developing, and assuring accessibility to outdoor recreation resources.

Migratory Bird Treaty Act of 1918

Makes it unlawful to "take" migratory birds, their eggs, feathers, or nests. A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. Presidential executive order number 13186 additionally directs Federal agencies to integrate bird conservation into agency activities and to design migratory bird habitat and conservation principles and practices into agency environmental planning.

Mineral Leasing Act of February 25, 1920

Provides that the deposits of certain minerals on land owned by the United States shall be subject to lease to citizens of the United States, provided royalties on such deposits are paid to the United States.

Mining Claims Rights Restoration Act of August 11, 1955

States that all public lands belonging to the United States which have been withdrawn or reserved for power development or power sites shall be open to entry for location and patent of mining claims and mineral development, subject to certain conditions.

Mining and Minerals Policy Act of December 31, 1970

States that it is the policy of the Federal Government to foster and encourage the development of economically sound and stable domestic mining, minerals, metal, and mineral reclamation industries; the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security, and environmental needs; mining, mineral, and metallurgical research to promote the wise and efficient use of our natural and reclaimable mineral resources; and the study and development of methods for the disposal, control, and reclamation of mineral waste products and the reclamation of mined land.

Multiple-Use Sustained-Yield Act of June 12, 1960 (16 U.S.C. 528-531)

States that it is the policy of Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes, and authorizes and directs the Secretary of Agriculture to develop and administer the renewable

surface resources of the national forests for the multiple use and sustained yield of products and services.

National Environmental Policy Act of January 1, 1970

Directs all Federal agencies to consider and report the potential environmental impacts of proposed Federal actions and established the Council on Environmental Quality.

National 1990 Farm Bill (Title XII – Forest Stewardship Act) Act of November 28, 1990

Directs the Secretary of Agriculture to establish a competitive forestry, natural resources, and environmental grants program, and provides for other research programs.

National Forest Management Act of October 22, 1976

The National Forest Management Act reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on National Forest System lands. The National Forest Management Act requires the Secretary of Agriculture, public agencies, or a combination of these methods. The act also authorizes the secretary to grant rights-of-way and easements over National Forest System lands.

National Forest Roads and Trails Act of October 13, 1964

Authorizes the Secretary of Agriculture to provide for the acquisition, construction, and maintenance of forest development roads within and near the national forests through the use of appropriated funds, deposits from timber sale purchasers, cooperative financing with other public agencies, or a combination of these methods. The act also authorizes the secretary to grant rights-of-way and easements over National Forest System lands.

National Historic Preservation Act of 1966 as amended (NHPA) (16 U.S.C. 470)

Sets forth the Federal Government's policy to preserve and protect historical and cultural resources. This act states that the historical and cultural foundations of the Nation should be preserved as a living part of the Nation's community life and development in order to give a sense of orientation to the American people. Directs all Federal agencies to take into account the effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. Establishes inventory, nomination, protection, and preservation responsibilities for federally owned historic properties. As amended extends the policy in the Historic Sites Act to State and local historical sites as well as those of national significance, expands the National Register of Historic Places, establishes the Advisory Council on Historic Preservation and the State Historic Preservation Officers, and requires agencies to designate Federal preservation officers. Establishes criteria for designating tribal historic preservation officers to assume the functions of a state historic preservation officer on tribal Lands.

Section 101(a) (8): Gives the Secretary of the Interior the responsibility and authority to assess "significant threats" to properties included in, or eligible for inclusion in, the National Register in order to determine the kinds of properties that may be threatened; ascertain the causes of the threats; and develop and submit to the President and Congress recommendations for appropriate action.

Section 106: Requires each agency to take into account the effects of its actions on historic properties prior to approving expenditure of Federal funds on an undertaking or prior to issuing any license. Furthermore, an agency must afford the State Historic Preservation Office, the Tribal Historic Preservation Office, and the Advisory Council on Historic Preservation (an independent Federal agency created by the National Historic Preservation Act) an opportunity to comment on any of the agency's undertakings that could affect historic properties.

Section 110 (a)(2)(A): Directs Federal agencies to establish "a preservation program for the identification, evaluation, and nomination to the National Register of Historic Places, and protection of historic properties" to "ensure that such properties under the jurisdiction or control of the agency are identified, evaluated, and nominated to the National Register." This would require development of a schedule for the identification, evaluation, and nomination of unrecorded sites.

National Trails System Act of October 2, 1968 (16 U.S.C.1241-1251)

Created a series of national trails "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation." The Act and its subsequent amendments authorized a national system of trails and defined four categories of national trails. National Scenic Trails (NST) provide outdoor recreation and the conservation and enjoyment of significant scenic, historic, natural, or cultural qualities; National Historic Trails (NHT) follow travel routes of national historic significance; National Recreation Trails (NRT) are in, or reasonably accessible to, urban areas on Federal, state, or private lands; and Connecting or Side Trails provide access to or among the other classes of trails.

Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. 3001)

Provides a process for Federal agencies to return Native American human remains, funerary objects, and sacred objects to the ancestors and appropriate Native American tribe. Includes provisions for the intentional excavation and unanticipated discovery of Native American cultural items on Federal and tribal lands, and penalties for noncompliance and illegal trafficking. The act requires agencies to identify holdings of such remains and objects and to work with appropriate Native American groups toward their repatriation.

New Mexico Wilderness Act of 1980 (16 U.S.C. §1132 et seq.)

Authorized the designation of a few wilderness areas in New Mexico following the wilderness act of 1964. Additional land was also added to existing wilderness areas.

North American Wetlands Conservation Act of December 13, 1989

Authorizes a wetlands habitat program that provides grants to protect and manage habitats for migratory birds and other wetland wildlife in the United States, Mexico, and Canada.

Oil and Gas Leasing Reform Act of 1987

Amended the Mineral Lands Leasing Act of 1920 regarding competitive leasing of oil and gas for onshore Federal lands. Sets forth guidelines for the promulgation of regulations regarding lease sales, and prohibits the issuance of oil or gas leases upon certain lands allocated or designated as wilderness areas.

Organic Administration Act of June 4, 1897

Authorizes the President to modify or revoke any instrument creating a national forest; states that no national forest may be established except to improve and protect the forest within its boundaries, for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. Authorizes the Secretary of Agriculture to promulgate rules and regulations to regulate the use and occupancy of the national forests.

Pipelines Act of February 25, 1920

Authorizes the Secretary of the Interior or appropriate agency head to grant rights-of-way through any Federal lands for pipeline purposes for the transportation of oil, natural gas, synthetic liquid or gaseous fuels, or any refined product produced therefrom to any applicant possessing the qualifications provided in the act.

Public Buildings Cooperative Use Act of 1976

Authorizes the Federal government to acquire and utilize space in suitable buildings of historic, architectural, or cultural significance, unless use of such space would not prove feasible and prudent compared with available alternatives; to encourage the location of commercial, cultural, educational, and recreational facilities and activities within public buildings; to provide and maintain space, facilities, and activities, to the extent practicable, which encourages public access to and stimulates public pedestrian traffic around, into, and through public buildings, permitting cooperative improvements to and uses of the area between the building and the street, so that such activities complement and supplement commercial, cultural, educational, and recreational resources in the neighborhood of public buildings; and to encourage the public use of public buildings for cultural, educational, and recreational activities.

Public Rangelands Improvement Act of October 25, 1978

Establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; charge a fee for public grazing use which is equitable; continue the policy of protecting wild free roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free roaming horses and burros which pose a threat to themselves, their habitat, and to other rangeland values.

Rehabilitation Act of 1973, as amended

States that it is national policy that the Federal government plays a leadership role in promoting the employment of individuals with disabilities, and in assisting states and providers of services in fulfilling the aspirations of such individuals with disabilities for meaningful and gainful employment and independent living.

Religious Freedom Restoration Act (RFRA) (42 U.S.C. § 2000bb)

Government shall not substantially burden a person's exercise of religion even if the burden results from a rule of general applicability, except when the government demonstrates that

application of the burden to the person is in furtherance of a compelling governmental interest; and is the least restrictive means of furthering that compelling governmental interest.

Rescission Act of 1995

Directs the Forest Service to establish and adhere to a schedule for analysis and decisions on all grazing allotments where National Environmental Policy Act of 1969 (NEPA) compliance is required. Notwithstanding any other law, term grazing permits which expire or are waived before the NEPA analysis and decision pursuant to the schedule developed by individual Forest Service System units, shall be issued on the same terms and conditions and for the full term of the expired or waived permit. Upon completion of the scheduled NEPA analysis and decision for the allotment, the terms and conditions of existing grazing permits may be modified, if necessary, to conform to such NEPA analysis and subsequent decision.

Safe Drinking Water Amendments of November 18, 1977

Authorizes appropriations for research conducted by the EPA relating to safe drinking water; Federal grants to states for public water system supervision programs and underground water resource protection programs; and grants to assist special studies relating to the provision of a safe supply of drinking water.

Secure Rural Schools and Community Self-Determination Act of 2000

Through this law the Forest Service gives rural communities the means to build and improve schools, and provide road maintenance, emergency services, and conservation programs for their citizens. Thus, communities are no longer dependent on Federal timber sales from national forests to improve local schools and roads.

Sikes Act of October 18, 1974, as amended

Authorizes the Secretary of the Interior and the Secretary of Agriculture, in cooperation with the state agencies, to develop, maintain, and coordinate programs on public lands under their jurisdiction for the conservation and rehabilitation of wildlife, fish, and game. Provides that no individual will be permitted to hunt, trap, or fish on any public land within the State which is subject to a conservation and rehabilitation program under this section unless he/she has a valid public land management stamp. Makes provisions for the issuance and sale of such stamps.

Small Tracts Act of January 22, 1983

Authorizes the Secretary of Agriculture to sell, exchange, or interchange by quitclaim deed all right, title and interest, including the mineral estate, of the United States in and to certain lands within the national forest when he/she determines it to be in the public interest.

Soil and Water Resources Conservation Act of November 18, 1977

Provides for a continuing appraisal of the United States' soil, water and related resources, including fish and wildlife habitats, and a soil and water conservation program to assist landowners and land users in furthering soil and water conservation.

Surface Mining Control and Reclamation Act of August 3, 1977

Authorizes the Secretary of Agriculture to enter into agreements with landowners, providing for land stabilization, erosion, and sediment control, and reclamation through conservation treatment, including measures for the conservation and development of soil, water, woodland, wildlife, and recreation resources, and agricultural productivity of such lands.

Timber Exportation Act of April 12, 1926

Authorizes the exportation of lawfully cut timber from the state or territory where grown if the supply of timber for local use will not be endangered, and authorizes the Secretary to issue rules and regulations to carry out the provisions of the act.

Transfer Act of February 1, 1905

Transferred the management and control of the Forest Reserves from the General Land Office (GLO) in the Department of the Interior to the Bureau of Forestry in the Department of Agriculture.

Tribal Forest Protection Act of 2004 (Public Law 108-278)

Authorizes the Secretary of Agriculture and the Secretary of the Interior to enter into an agreement or contract with Indian tribes meeting certain criteria to carry out projects to protect Indian forest land.

U.S. Mining Laws (Public Domain Lands) Act of May 10, 1872

Provides that all valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are free and open to exploration and purchase, and the lands in which they are found to occupation and purchase by citizens of the United States and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or rules of miners, so far as the same are applicable and not inconsistent with the laws of the United States. There are a number of acts which modify the mining laws as applied to local areas by prohibiting entry altogether or by limiting or restricting the use which may be made of the surface and the right, title, or interest which may pass through patent

Water Quality Improvement Act of April 3, 1965

Authorizes greater water quality standards to be implemented and regulations that reduce water pollutants.

Water Resources Planning Act of July 22, 1965

Encourages the conservation, development, and utilization of water and related land resources of the United States on a comprehensive and coordinated basis by the Federal Government, states, localities, and private enterprises.

Watershed Protection and Flood Prevention Act of August 4, 1954

Establishes policy that the Federal government should cooperate with states and their political subdivisions, soil or water conservation districts, flood prevention or control districts, and other

local public agencies for the purposes of preventing erosion, floodwater, and sediment damages in the watersheds of the rivers and streams of the United States; furthering the conservation, development, utilization, and disposal of water, and the conservation and utilization of land; and thereby preserving, protecting, and improving the Nation's land and water resources and the quality of the environment.

Weeks Law of 1911 as amended (at 16 U.S.C. 515, 552)

Authorizes the Secretary of Agriculture to enter into agreements with States for the purpose of conserving forests and water supply, and, to acquire forested, cutover, or denuded lands within the watersheds of navigable streams to protect the flow of these streams or for the production of timber, with the consent of the state in which the land lies.

Wild Free-Roaming Horses and Burros Act of December 15, 1971, as amended by Federal

Protects wild free roaming horses and burros from capture, branding, harassment, or death; and states they are to be considered in the area where presently found an integral part of the natural system of the public lands.

Wild and Scenic Rivers Act of October 2, 1968

Instituted a National Wild and Scenic Rivers System by designating the initial components of that system, and by prescribing the methods by which and standards according to which additional components may be added to the system from time to time.

Wilderness Act of September 3, 1964

Established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as “wilderness areas” and administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness. Provides for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness. States that no Federal lands shall be designated as “wilderness areas” except as provided for in the act or by a subsequent act.

Santa Fe NF wilderness areas are designated under the following authorities:

- New Mexico Wilderness Act of 1980 (Public Law 96-550) designates Pecos Wilderness, and San Pedro Parks Wilderness.
- Endangered American Wilderness Act of 1978 (Public law 95-237) designates the Chama River Canyon Wilderness area.
- The Wilderness Act of 1964 (Public law 88-577) adds 55,000 acres to Pecos Wilderness areas.

Youth Conservation Corps Act of August 13, 1970

Establishes a Youth Conservation Corps whom the Secretaries of the Interior or Agriculture may employ without regard to the civil service or classification laws, rules, or regulations for the purpose of developing, preserving, or maintaining the lands and waters of the United States.

Executive Orders

A partial listing of relevant executive orders follows. Executive orders are official mandates presented by the President of the United States and go through judicial review. An executive order may be used to reassign functions among executive branch agencies. It may adopt guidelines, rules of conduct, or rules of procedure for government employees or units of government.

EO 11514 issued March 5, 1970, as amended by E.O. 11991 issued May 24, 1977. Protection and enhancement of environmental quality (35 FR 4247, March 7, 1970)

This order states that the Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. This order provides for monitoring, evaluation, and control on a continuing basis of the activities of each Federal agency so as to protect and enhance the quality of the environment.

EO 11593 Protection and Enhancement of the Cultural Environment, 1973

Mandates that the Federal government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation, and that Federal agencies shall administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; initiate measures necessary to direct their policies, plans, and programs in such a way that federally-owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people; and, in consultation with the Advisory Council on Historic Preservation, institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.

EO 11644 issued February 8, 1972. Use of off-road vehicles on the public lands. (37 FR 2877, February 9, 1972). Amended by E.O. 11989 issued May 24, 1977 and E.O. 12608 issued September 9, 1987

This order requires Federal agencies to develop and implement procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.

EO 11988 (Floodplain Management (42 CFR 26951, May 25, 1977)

The purpose of this order is "…to avoid to the extent possible the long and short term impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." Section 1 states: "Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) Providing federally undertaken, financed, or assisted construction and improvements; and (3) Conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities."

EO 11990 Protection of Wetlands, 1977

Requires each Federal agency to provide leadership and to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for acquiring, managing, and disposing of Federal lands and facilities; providing federally undertaken, financed, or assisted construction and improvements; and conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

EO 12862 Setting Customer Service Standards, 1993

Requires all executive departments and agencies that provide significant services directly to the public to provide those services in a manner that seeks to meet the customer service standard established in the order, and requires agencies to identify customers, survey customers and front-line employees to determine the kind and quality of services needed and barriers to those services, benchmark customer service performance against the best in the business, make information, services, and complaint systems easily accessible, and provide a means to address customer complaints.

EO 12898 Federal Actions to Address Environmental Justice in Minority and Low-Income Populations

Addresses environmental justice in minority and low-income populations and is designed to focus Federal attention on the environmental and human health conditions in minority communities and low-income communities with the goal of achieving environmental justice. The order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority communities and low-income communities' access to public information on, and an opportunity for public participation in, matters relating to human health or the environment.

EO 13007 Indian Sacred Sites, 1996

Requires each executive branch agency with statutory or administrative responsibility for the management of Federal lands, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

EO 13112 Invasive Species, 1999

Ensures that Federal programs and activities to control and prevent invasive species are coordinated, effective, and efficient. It defines invasive species as "…an alien (or nonnative) whose introduction does or is likely to cause economic or environmental harm or harm to human health."

EO 13175 Consultation and Coordination with Indian Tribal Governments

Promotes regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, strengthens the United States

government-to-government relationships with Indian tribes, and reduces the imposition of unfunded mandates upon Indian tribes.

EO 13186 Responsibility of Federal Agencies to Protect Migratory Birds

Directs Federal agencies, as practicable, to support the conservation of migratory birds, restore and enhance the habitat of migratory birds, prevent or abate pollution or detrimental alteration of the environment for the benefit of migratory birds, ensure agency plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts such as Partners-in-Flight, ensure that environmental analyses of Federal actions required by NEPA evaluate effect on migratory birds, and promote research, education, and training related to conservation of migratory birds.

EO 13195 Trails for America in the 21st Century

"Federal agencies will… protect, connect, promote, and assist trails of all types… This will be accomplished by… protecting the trail corridors associated with National Scenic Trails… to the degree necessary to ensure that the values for which [the] trail was established remain intact."

EO 13287 Preserve America, 2003

Advances the protection, enhancement, and contemporary use of the historic properties owned by the Federal government, and promotes intergovernmental cooperation and partnerships for the preservation and use of historic properties. Directs Federal agencies to increase their knowledge of historic resources in their care and to enhance the management of these assets.

Encourages agencies to seek partnerships with state, tribal, and local governments and the private sector to make more efficient and informed use of their resources for economic development and other recognized public benefits. Better combines historic preservation and nature tourism by directing agencies to assist in the development of local and regional nature tourism programs using the historic resources that are a significant feature of many state and local economies.

EO 13352 Facilitation of Cooperative Conservation, 2004

Ensures that the Departments of the Interior, Agriculture, Commerce, and Defense and the Environmental Protection Agency implement laws relating to the environment and natural resources in a manner that promotes cooperative conservation, with an emphasis on appropriate inclusion of local participation in Federal decision-making, in accordance with their respective agency missions, policies, and regulations.

EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management

Directs Federal agencies to conduct their environmental, transportation, and energy-related activities in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner.

EO 13433 Facilitation of Hunting Heritage and Wildlife Conservation, 2007

Directs Federal agencies with programs and activities that have a measurable effect on public management, outdoor recreation, and wildlife management, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

EO 13514 Federal Leadership in Environmental, Energy, and Economic Performance

Expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423. The goal is to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions a priority for Federal agencies. Lays out numerical targets for agencies, sets non-numerical targets that agencies must reach, and calls for specific management strategies to improve sustainability.

EO 13604 Improving Performance of Federal Permitting and Review of Infrastructure Projects

An initiative to modernize decision-making processes throughout the federal government through improved efficiency and transparency. On May 17, 2013, in following up on the Executive Order, President Obama issued a Presidential Memorandum—"Modernizing Federal Infrastructure Review and Permitting Regulations, Policies, and Procedures" (The White House, 2013). The memorandum highlighted the need for improved mitigation policies that provide project developers with greater predictability, facilitate landscape-scale mitigation and interagency mitigation plans (where appropriate), and enhance accountability, transparency, and effectiveness. The administration has charged the Forest Service with participating in this modernization effort.

Forest Service Directives

The following is a partial listing of Forest Service policies relevant to the forest plan. A complete listing can be found in the Forest Service Manual and the Forest Service Handbook. Together, these are known as the Forest Service Directives System.

The Forest Service Manuals contain legal authorities, goals, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff, in more than one unit, to plan and execute assigned programs and activities. Forest Service Handbooks (FSH) are directives that provide instructions and guidance on how to proceed with a specialized phase of a program or activity. Handbooks either are based on a part of the FSM or they incorporate external directives. Forest Service Manuals and applicable Forest Service Handbooks provide guidance only and do not provide required direction.

FSM 1000 Organization and Management

FSM 1010 Laws, Regulations, and Orders
FSM 1020 Forest Service Mission
FSM 1400 Controls
FSM 1410 Management Reviews

FSM 1500 External Relations

FSM 1560 State, Tribal, County, and Local Agencies, Public and Private Organizations
FSM 1563 American Indian and Alaskan Native Relations

FSM 1600 Information Resources

FSM 1900 Planning

FSH 1909.12
- Chapter 10 - Assessments
- Chapter 20 - Land Management Plan
- Chapter 30 - Monitoring
- Chapter 40 - Public Participation
- Chapter 50 - Objection Process
- Chapter 60 - Forest Vegetation Resource Management
- Chapter 70 - Wilderness Recommendation
- Chapter 80 - Wild and Scenic River Evaluation

FSM 1900 - Zero Code
FSM 1910 - National Resource Planning
FSM 1920 - Land and Resource Management Planning
FSM 1930 - Program Development and Budgeting
FSM 1950 - Environmental Policy and Procedures
FSM 1960 - Policy Analysis
FSM 1970 - Economic and Social Analysis
FSM 1990 - Special Plans and Studies

FSM 2000 National Forest Resource Management

FSM 2020 Ecological Restoration and Resilience
FSM 2030 Large Scale Event Recovery
FSM 2060 Ecosystem Classification, Interpretation, and Application
FSM 2070 Biological Diversity
- FSM 2070.3 Vegetation Ecology (use of native plants in revegetation, rehabilitation, and restoration)

FSM 2080 Noxious Weed Management, Southwestern Region supplement (weed free policy)
FSH 2090.11 Ecological Classification and Inventory Handbook

FSM 2200 Range Management

Chapter 2090

FSM 2260 Wild Free-Roaming Horses and Burros

FSM 2300 Recreation, Wilderness, and Related Resource Management

FSH 2309.18 Trails Management Handbook
FSH 2309.24 Cultural Resources Handbook, Southwestern Region Supplement, Chapter 10 – Survey Standards
FSH 2309.24 Cultural Resources Handbook, Southwestern Region Supplement, Chapter 40 – Damage Assessment
FSM 2310 Sustainable Recreation Planning
FSM 2320 Wilderness Management
- FSM 2323.22-Exhibit 01, Congressional Grazing Guidelines

FSM 2330 Forest Service Planning, Design, Operation, and Maintenance of Developed Recreation Sites
FSM 2350 Trail, River, and Similar Recreation Opportunities
- FSM 2353.4 Administration of National Scenic and National Historic Trails

FSM 2360 Heritage Program Management
- FSM 2360 Special Interest Areas, Southwestern Region Supplement 2300-99-3

FSM 2380 Landscape Management
FSM 2300-99-3 Southwest Region Supplement

FSM 2400 Timber Management, Southwestern Region

FSM 2430 Commercial Timber Sales, Southwestern Region, Small Sales and Commercial/Personal Use Permits of Timber, Fuelwood, and other forest products
FSM 2470 Silvicultural Practices

FSM 2500 Watershed and Air Management

FSH 2509.13 – Burned-Area Emergency Rehabilitation Handbook
FSH 2509.16 Water Resource Inventory Handbook
FSH 2509.21 National Forest System Water Rights Handbook
FSH 2509.22 Soil and Water Conservation Handbook
FSH 2509.23 Riparian Area Handbook
FSH 2509.24 National Forest System Watershed Codes Handbook
FSH 2509.25 Watershed Conservation Practices Handbook

FSM 2510 Watershed Planning
FSM 2520 Watershed Protection and Management
FSM 2526 Riparian Area Management
FSM 2527 Floodplain Management and Wetland Protection
FSM 2530 Water Resource Management
FSM 2532 Water Quality Management
FSM 2540 Water Uses and Development, Southwestern Region supplement
FSH 2509.25 Watershed Conservation Practices Handbook
FSM 2560 Groundwater Resource Management
FSM 2580 – Air Resource Management

FSM 2600 Wildlife, Fish, and Sensitive Plant Habitat Management

FSM 2610 Cooperative Relations
FSM 2630 Management of Wildlife and Fish Habitat
FSM 2670 Threatened, Endangered and Sensitive Plants and Animals

FSM 2700 Special Uses Management

FSM 2726 Energy Generation and Transmission
FSM 2728 Communications
FSH 2709.11 Special Uses Handbook
FSH 2709.14 Recreation Special Uses Handbook

FSM 2800 Minerals and Geology

FSM 2810 Mining Claims
FSM 2820 Mineral Leases, Permits, Licenses
FSM 2850 Mineral Materials
FSH 2809.15 Minerals and Geology Handbook
FSM 2880 Geologic Resources, Hazards, and Services

FSM 3100 Cooperative Fire Protection

FSM 3400 Forest Pest Management

FSM 3400 Forest Health Protection and Southwestern Region Supplement 3400-91-1

FSM 5100 Fire Management

FSM 5400 Land Ownership
FSM 5410 Appraisals
FSM 5420 Land Purchases and Donations
FSH 5409.13 Land Acquisition Handbook
FSM 5430 Exchanges
FSM 5460 Right-of-Way Acquisition
FSH 5409.17 Rights-of-Way Acquisition Handbook

FSM 5500 Land Ownership Title Management

FSM 7300 Buildings and Other Structures
FSM 7310 Buildings and Related Facilities
FSH 7309.11 Buildings and Related Facilities Handbook

FSM 7400 Public Health and Pollution Control Facilities
FSM 7420 Drinking Water

FSM 7500 Water Storage and Transportation

FSM 7700 Transportation System
FSM 7710 Travel Planning
FSH 7709.55 Travel Analysis
FSH 7709.56 Pre-construction Handbook
FSH 7709.57 Road Construction Handbook
FSH 7709.59 Road Operations
FSM 7720 Development (Policy on Transportation)
FSM 7730 Operation and Maintenance

State and Local Laws and Regulations

20.6.1-4,6,11 NMAC - Environmental Protection
Regional Haze Rule to meet PM 2.5 and ozone standards
Conservation Agreement for Rio Grande Cutthroat Trout in the States of Colorado and New Mexico (2013)

Code of Federal Regulations (CFR)

33 CFR 323 Permits for Discharges of Dredged or Fill Material into Waters of the United States

Authorize the discharge of dredged or fill material into waters of the United States. Certain discharges of dredged or fill material into waters of the United States are also regulated under other authorities of the Department of the Army. These include dams and dikes in navigable waters of the United States

36 CFR 60 National Register of Historic Places, Criteria for Evaluation

Sets forth the procedural requirements for listing properties on the National Register.

36 CFR 62 National Natural Landmarks Program

The procedures in this part set forth the processes and criteria for the identification, evaluation, designation, and monitoring of national natural landmarks.

36 CFR 63 Determinations of Eligibility for Inclusion in the National Register of Historic Places

Developed to assist agencies in identifying and evaluating the eligibility of properties for inclusion in the National Register, and to explain how to request determinations of eligibility

36 CFR 65 National Historic Landmarks Program

Sets forth the criteria for establishing national significance and the procedures used by the Department of the Interior for conducting the National Historic Landmarks Program.

36 CFR 79 Curation of Federally-Owned and Administered Archaeological Collections

Establishes standards, procedures, and guidelines to be followed by Federal agencies to preserve collections of prehistoric and historic material remains and associated records that are recovered in conjunction with Federal projects and programs under certain Federal statutes. This action should ensure that federally owned and administered collections of prehistoric and historic materials remains and associated records are deposited in repositories that have the capability to provide adequate long-term curatorial services.

36 CFR 212 Travel Management

Sets forth the requirements for the development and administration of the forest development transportation system.

36 CFR 215.5 Road System Management

Traffic on roads is subject to State traffic laws where applicable. For each national forest or national grassland, the responsible official must identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands.

36 CFR 219 Planning

Sets forth a process for developing, adopting, and revising land management plans for the National Forest System.

36 CFR 219.24 Cultural and Historical Resources

Provides guidance for addressing cultural resources in forest plans. Forest planning shall provide for the identification, protection, interpretation, and management of significant cultural resources on NFS lands.

36 CFR 221 Timber Management Planning

Sets forth the requirements for management plans for national forest timber resources.

36 CFR 222 Range Management

Sets forth the requirements for range management on the national forests, and for the administration of wild and free roaming horses and burros and their environment. See Subpart B (Management of Wild Free-Roaming Horses and Burros).

36 CFR 223.1 Authority to Sell Timber

Sets forth the requirements relating to the sale and disposal of National Forest System timber.

36 CFR 223.5 through 36 CFR 223.10 Parks, Forests, and Public Property, Scope of Free-Use Granted to Individuals, Cutting and Removal of Timber in Free-Use Areas, Permission for Free-Use of Timber Outside Free-Use Areas, Delegations of Authority to Approve Free Use by Individuals, Free-Use to Owners of Certain Mining Claims, Free-Use to Alaskan Settlers, Miners, Residents, and Prospectors

36 CFR 223.12 Permission to Cut, Damage, or Destroy Trees without Advertisement

36 CFR 223.261 Sale and Disposal of National Forest System Timber; Special Forest Products and Forest Botanical Products

36 CFR 228 Minerals

Sets forth the rules and procedures through which use of the surface of National Forest System lands, in connection with mining and mineral operations, shall be conducted so as to minimize adverse environmental impacts on National Forest System surface resources.

36 CFR 228.42 Plan of Operations - Notice of Intent- Requirements

A notice of intent to operate is required from any person proposing to conduct operations which might cause significant disturbance of surface resources.

36 CFR 228.57 Plan of Operations - Approval

A proposed plan of operation shall be submitted to the District Ranger, who will promptly acknowledge the operator. The authorized officer shall analyze the proposal, considering the economics of the operation along with the other factors in determining the reasonableness of the requirements for surface resource protection.

36 CFR 228, Subpart A – Locatable Minerals

36 CFR 228 Subpart E, Oil and Gas Resources

36 CFR 241.2 Fish and Wildlife

Sets forth the rules and procedures relating to the management, conservation, and protection of fish and wildlife resources on National Forest System lands.

36 CFR 251 Land Uses

Sets forth the rules and procedures relating to the use and occupancy of National Forest System lands.

36 CFR 251.9 Management of Municipal Watersheds

The Forest Service will observe national forest watersheds that supply local watersheds under multiple use prescriptions in forest plans.

36 CFR 254 Land ownership Adjustments

Sets forth the rules and procedures relating to exchange and conveyance of National Forest System lands.

36 CFR 261 Prohibitions in Areas

Sets forth the general prohibitions relating to the use and occupancy of National Forest System lands.

36 CFR 800 Protection of Historic Properties

Provides explicit direction for the identification of sites, the determination of project effects on sites, and requirements for consultation with the appropriate State Historic Preservation Office, any relevant Tribal Historic Preservation Office, and the Advisory Council on Historic Preservation, as well as how to develop agreements.

36 CFR 291.19 Suspension and Revocation of Permits

Authorizes appointed officer to revoke permit when resource management is violated.

36 CFR 293 Wilderness-Primitive Areas

Sets forth the requirements for the administration of wilderness and primitive areas.

36 CFR 294 Special Areas: Roadless Area Conservation (Special Areas; Roadless Area Conservation; Final Rule, 66 Fed. Reg. 3243 (January 12, 2001)

Sets forth the requirements for designation of inventoried roadless areas, providing lasting protection for landscapes within the National Forest System under multi-use management.

36 CFR 295 Use of Motor Vehicles off Forest Development Road

Sets forth the rules and procedures relating to the administrative designation and location of specific areas and trails of National Forest System lands on which the use of motor vehicles traveling off of national forest development roads is allowed.

36 CFR 296 Protection of Archaeological Resources: Uniform Regulations

Implements the Archaeological Resources Protection Act by establishing the uniform definitions, standards, and procedures for Federal land managers to follow in providing protection for archaeological resources located on public lands and Indian lands, including definitions of prohibited acts and penalties. The regulations also provide requirements for issuing permits under the authority of the Archaeological Resources Protection Act to any person proposing to excavate and/or remove archaeological resources from public lands or Indian lands.

36 CFR 297 Wild and Scenic Rivers

Sets forth the rules and procedures relating to Federal assistance in the construction of water resources projects affecting wild and scenic rivers or study rivers on lands administered by the Secretary of Agriculture.

36 CFR 800 Protection of historic Properties

Sets forth the provisions for the administration of the National Historic Preservation Act

40 CFR 51.300-309 Regional Haze Rule

The primary purposes of this subpart are to require states to develop programs to assure reasonable progress toward meeting the national goal of preventing any future, and remedying any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from human-made air pollution; and to establish necessary additional procedures for new source permit applicants, states and Federal land managers to use in conducting the visibility impact analysis required for new sources under §51.166. This subpart sets forth requirements addressing visibility impairment in its two principal forms: "reasonably attributable" impairment (i.e., impairment attributable to a single source/small group of sources) and regional haze (i.e., widespread haze from a multitude of sources which impairs visibility in every direction over a large area).

40 CFR 121-135 Water Programs

Sets forth the provisions for the administration of water programs including state certification of activities requiring a Federal license or permit, EPA administered permit programs, state program requirements, procedures for decision making, criteria and standards for the National Pollutant Discharge Elimination System, toxic pollutant effluent standards, water quality planning and management, water quality standards, water quality guidance for the Great Lakes System, secondary treatment regulation, and, prior notice of citizen suits. See Title 40 (Protection of Environment), Chapter 1 (Environmental Protection Agency), subchapter D (Water Programs).

40 CFR 1502.12 Environmental Impact Statement

Carefully considers alternatives to a proposed action as well as providing probable mitigation procedures if needed.

43 CFR 3 Preservation of American Antiquities

Implements the provisions of the Antiquities Act of 1906.

43 CFR 10 Native American Graves Protection and Repatriation Act Regulations

Implements the provisions of the Native American Graves Protection and Repatriation Act of 1990.

49 CFR 24.102, 103, 104 Basic Acquisition Policies, Criteria for Appraisals, Review of Appraisals

Real property acquisition through negotiation, follows criteria for appraisals, and continues with review.

Programmatic Agreements

Memorandum of Agreement on Fostering Collaboration and Efficiencies to Address Water Quality Impairments on National Forest System Lands

Agreement between U.S. Forest Service and the U.S. Environmental Protection Agency signed in 2007: The purpose is to coordinate between agencies and address issues of water quality impairment regarding the 303 d list, as well as TMDLs. The leading causes of water quality impairments on national forest lands include temperature, excess sediment, and habitat modification. These issues are to be addressed via BMPs to the greatest extent possible. In terms of this project analysis area, BMPs can be applied to soil and watershed condition and are applicable everywhere in the Santa Fe NF.

Memorandum of Understanding. USFS MOU 17-MU-11031600-049/NMED MOU 18-667-2060-0003 6-27-17 NM Water Quality Protection Agreement

Agreement between the U.S. Forest Service Southwestern Region and the State of New Mexico Environment Department. Cooperation between the parties with the common objective of improving and protecting the quality of New Mexico's waters by implementing progressive watershed-based restoration protection programs to meet applicable water quality standards.

Memorandum of Understanding between Forest Service Southwestern Region and the State of New Mexico Environment Department

Memorandum of Understanding Regarding Interagency Coordination for Protection of Indian Sacred Sites

Memorandum of Understanding among the U.S. Department of Defense, U.S. Department of the Interior, U.S. Department of Agriculture, U.S. Department of Energy, and the Advisory Council on Historic Preservation Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites

Memorandum of Understanding between the Pueblo of Jemez and the USDA, Forest Service Santa Fe National Forest

Memorandum of Understanding between the Pueblo of Tesuque and the USDA, Forest Service Santa Fe National Forest

Memorandum of Understanding between the Pueblo of Cochiti and the USDA, Forest Service Santa Fe National Forest

Memorandum of Understanding between the Pueblo of Ohkay Owingeh and the USDA, Forest Service Santa Fe National Forest

Law Enforcement Agreement and Participating Agreement with the Pueblo of Jemez

Other Sources of Information

- Forest Service, Southwestern Region, Acequia Guidance (2019)